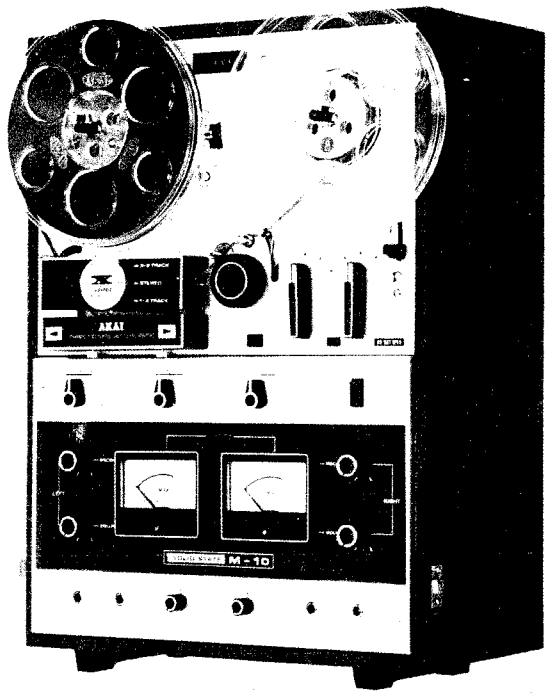
SERVICE MANUAL

AKAI TAPE RECORDER

MODEL M-10



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I. SPECIFICATIONS

STYLE : Portable
WEIGHT : 37.4 lbs (17 kg)
DIMENSIONS : 14" x 14" x 8-7/8"
(358 x 358 x 227 mm)
POWER SUPPLY : AC 100 to 240 V, 50/60 Hz
RECORDING SYSTEM
: In-line 4-track stereo, monaural recording by using Cross-field Bias Head.
PLAYBACK SYSTEM
: IN-line 4-track stereo, monaural playback.
TAPE SPEED : 1-7/8, 3-3/4 and 7-1/2 ips.
TAPE SPEED DEVIATION
: Within ± 0.8%
WOW AND FLUTTER
(Play back only) : Less than 0.1% r.m.s. at 7-1/2 ips.
Less than 0.2% r.m.s. at 3-3/4 ips.
Less than 0.3% r.m.s. at 1-7/8 ips.
FREQUENCY RESPONSE
: 30 to 25,000 Hz ± db at 7-1/2 ips.
30 to 18,000 Hz ± db at 3-3/4 ips.
40 to 9,000 Hz ± 4 db at 1-7/8 ips.
SIGNAL TO NOISE RATIO
: Better than 48 db (Forward Operation)
Better than 45 db (Reverse Operation)
DISTORTION : Within 3% at Line Output, 1,000 Hz O VU Recording and Playback.
CROSS TALK : Less than −65 db (Monaural)
Less than −43 db (Stereo)
ERASE RATIO : Less than −70 db
INSULATION RESISTANCE :
More than 50 M.Ohms
INSULATION DURABILITY
: 500 V. AC for more than one minute duration.
LINE OUTPUT : Output Impedance ..... 100 Ohms.
Required load impedance more than 25 K.Ohms.
1.23 V (+4 dbs)
POWER OUTPUT (External Speaker Jack) : 8 Watts (r.m.s.) per channel, total 16 watts
Inpedance ..... 8 ohms
DIN OUTPUT : 0.4 V
Output Impedance ..... 10 K.Ohms.
Required load impedance more than 50 K.Ohms.
LINE INPUT : Above 50 mV (−25 dbs)
Impedance .....175 k.Ohms.
DIN INPUT : High ..... Above 50 mV (−25 dbs)
Impedance .....150 mV (−45 dbs)
Low .....Avove 5 mV (−45 dbs)
Impedance ..... 27 K.Ohms.
MIC. INPUT : Above 0.5 mV (−65 dbs)
Impedance .....4.7 K.Ohms.
FAST FORWARD AND REWIND TIME
: 85 seconds for a full 1,200 foot tape at 50 Hz.
65 seconds for a full 1,200 foot tape at 60 Hz.

MONITOR SYSTEM : The program being recorded can be monitored by using.
Stereo Headphone (8 Ohms) .....
Stcteo Headphone Jack.
Crystal Receiver . Line Output Jack.
MOTORS
CAPSTAN MOTOR
: Hysteresis Synchronous 3-speed (2-4-8 pole) motor
Condenser Capacity 3 μF (50 Hz)
2 μF (60 Hz)
Revolution : 3,000 − 1,500 750 r.p.m. (50 Hz)
3,600 − 1,800 900 r.p.m. (60 Hz)
REEL MOTOR
: i112,outer-rotor motors.
Revolutions : 930 r.p.m. at 50 Hz 100 V
1,120 r.p.m. at 60 Hz 110 V
HEADS
REC/PLAY HEAD
: In-line 4-track stereo and monaural
Impedance ...1,200 Ohms at 1,000 Hz.
Cap ..... 2/1,000 mm
ERASE HEAD : In-line 4-track stereo
Impedance .....500 Ohms at 60 KHz.
Gap .....0.2 mm
BIAS HEAD : In-line 4-track stereo
Impedance .....500 Ohms at 60 KHz.
Gap .....0.2 mm
RECORDING LEVEL INDICATOR
: VERTICAL Indication VU Meter x 2
TRANSISTOR & IC USED
: 2 ICAA-072D 4 2SD92
2 2SC458 (B) 7 2SC372
4 2SC693FU 4 2SC971
1 2SD223
DIODE USED : 1 SB-3-01P 3 IN34A
1 10D4 1 5B2
4 V06C 1 RD24A (M)
REELS USED : 7", 5", 3" reels
10-1/2" Reel Adaptor available optional accessory)

II. MEASURING METHOD

TAPE SPEED DEVIATION

1. Method involving use of pre-recorded tape.

For measuring the tape speed diviation, play back the pre-recorded tape at 1,000 Hz ± 0.1%. Connect the appropriate output to a frequency counter meter in order to measure the tape speed deviation from the resulting deviation of the measured frequency.

2. Method involving use of timing tape. (designed for tape speed measurement)

This method utilizes a timing tape marked at intervals of 7-1/2". The running time of over 60 marked sections of tape is measured in order to calculate the deviation of the tape speed. In applying this method, however, it should be kept in mind that the timing tape stretch or contract measurement enor is inevitable, so that it is necessary to measure the total length of the tape in advance.

WOW AND FLUTTER

Playback the 3,000 Hz pre-recorded tape of which the wow and flutter level is guaranteed to be smaller than 0.07% for measurement by means of a wow meter. It is also possible for a 3,000 Hz sine wave to be recorded and played for measurement by means of the wow meter. In this case, however, the wow meter indicates a value as much as twicc the value given in the specifications on the first page.

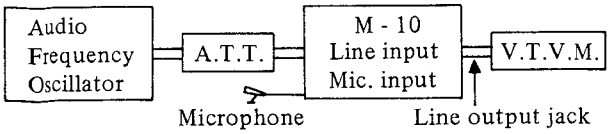
FRQUENCY RESPONSE

RECORD :

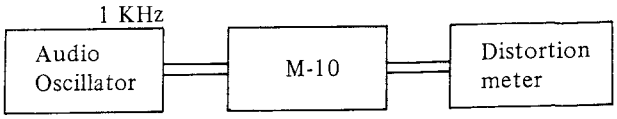
1) Give a sine wave of 1,000 Hz to the Line Input of the recorder to be tested through an attenuator from an audio frequency generator.
2) Set the Record/Playback Knob to "Rec" position and adjust the line input volume so that the VU Meter needle indicates "O" VU.
3) Set the Equalizer Switch to 7-1/2" or 3-3/4" position.
4) Under the condition described in (2), lower the input level 16 db by means of the attenuator.
5) Record the spot frequency in the range of 30 Hz to 25,000 Hz from the audio frequency generator.

PLAYBACK :

6) Set the Record/Playback Knob to "Play" position.
7) Connect a Vacuum Tube Volt Meter to the Line Output Jack. (VTVM with milli volt scale.)
8) Playback the reocrded tape.
9) Playback the recorded spot frequencies and make a memo of output level and plot the value on a graph.



TOTAL HARMONIC DISTORTION FACTOR



Connect the measuring instrument as shown above, and record the 1,000 Hz sine wave at "O" VU. Playback the resulting signal and measure the overall distortion factor. Measure the noise level of the tape recorder with the tape removed ; connect the audio oscillator dircctly to the distortion meter for measurement of the distortion factor of the oscillator.

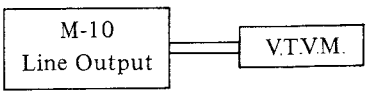
The required distortion factor may be obtamed from the results of the above measuement by the following formula :

$$d_0 = d - d_1 \quad d_2$$

where, d_0 = Required
d = Overall distortion factor
d_1 = Noise level
d_2 = Distortion factor of the oscillator

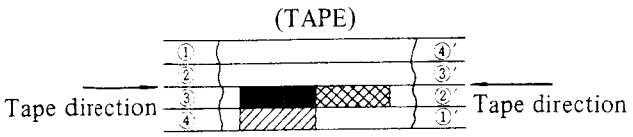
(Note : New tape of particularly good quality should be used for measurement of the distortion factor.)

SIGNAL TO NOISE RATIO



Set the Equalizer Switch to "7-1/2 ips" position and playback a tape containing a 25 Hz sine wave recorded at "O" VU level on a standard recorder. Connect a V.T.V.M. to the line output jack of the recorder and measure its output. Then remove the tape and measure the noise level under the same condition. Convert into decibels each of the measured values.

CROSSTALK (Crosstalk between the tracks)



As shown in the figure, first record a 1,000 Hz sine wave on track No.3 at +3 VU level. Next, remove the 1,000 Hz input signal and record under a non-input condition. Then, Playback the tape on track No.3 and No. 1 (reversed condition of tape) through the 1,000 Hz B.P.F. (Band Pass Filter, Sensitivity .... 1 : 1) and obtain a ratio between the two from the following formula.

$$C = 20 \log \frac{E_0}{E_2 - E_1} \text{ (db)}$$

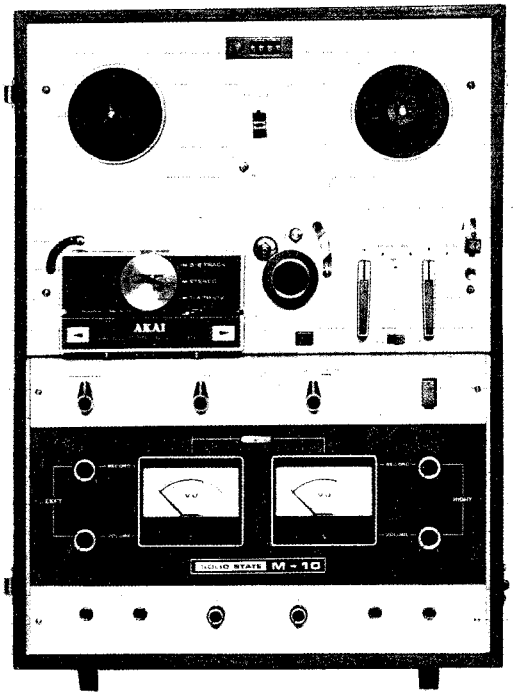
C = Desired crosstalk ratio (db)

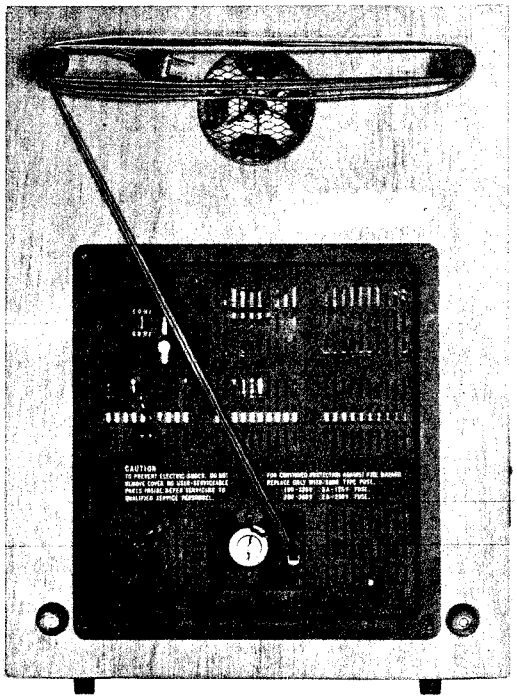
E_0 = 1,000 Hz signal output level

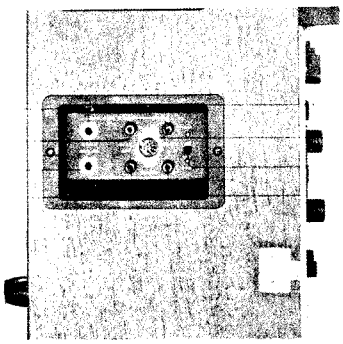
E_2 = 1,000 Hz crosstalk output level

E_1 = Non-input signal record level

III. CONTROL LOCATIONS



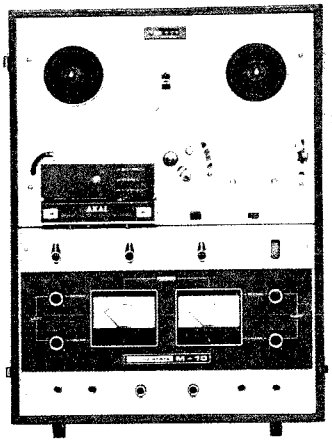


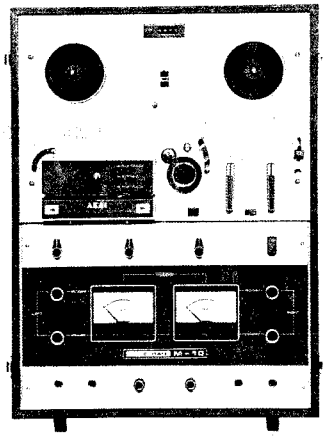


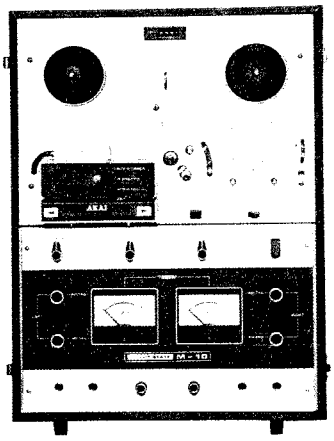
IV. DISMANTLING OF TAPE TRANSPORT UNIT & AMPLIFIERS

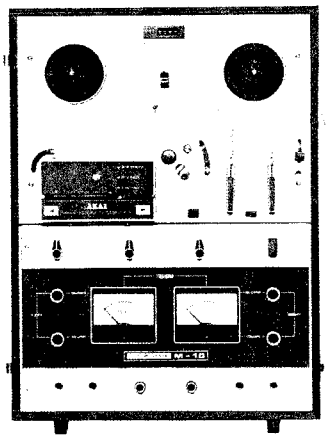
In case of trouble, etc, necessitating disassembly, please disassemble in the order shown in photographs. Remantle in reverse order.

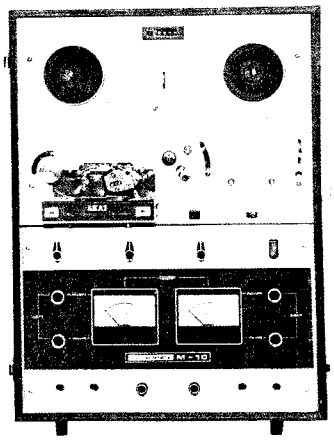
DISASSEMBLY OF TAPE TRANSPORT

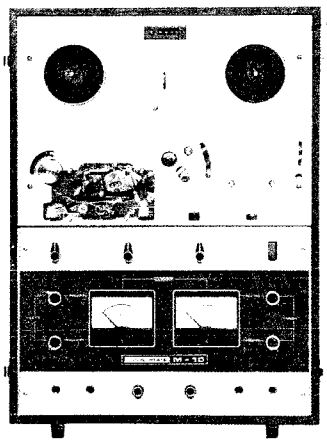


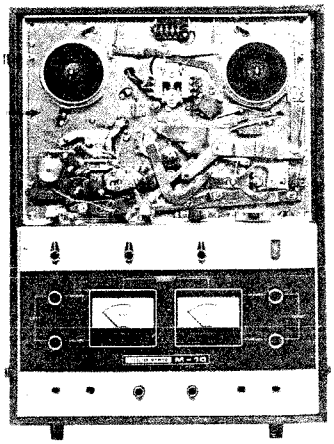


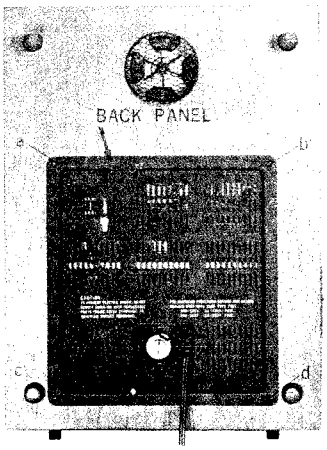


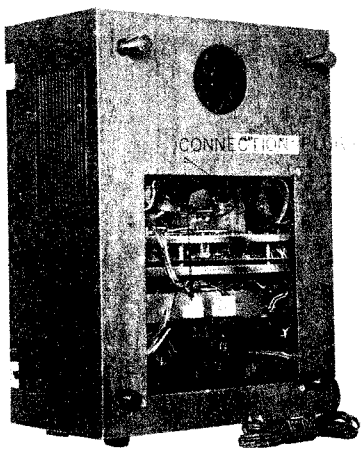


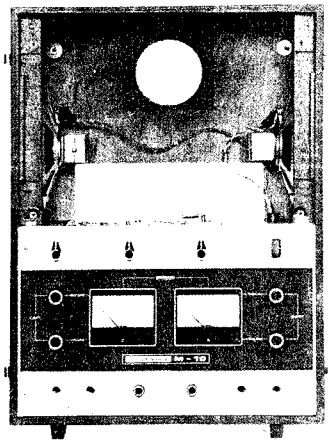


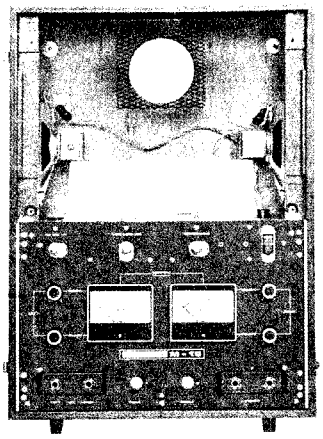


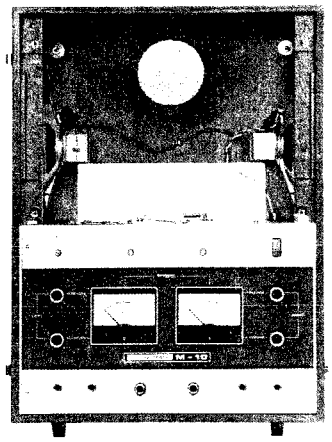


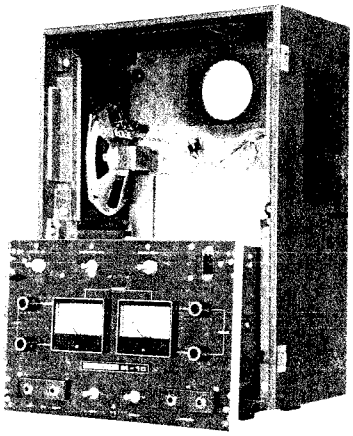

BACK PANEL

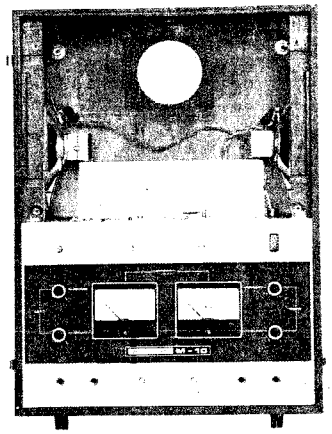

CONNECTEUR

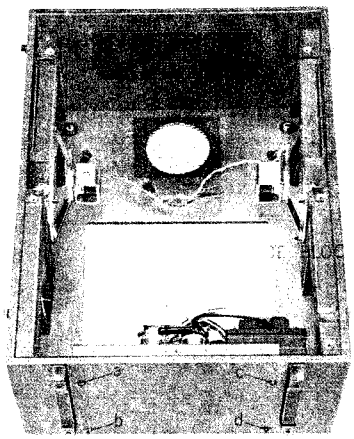


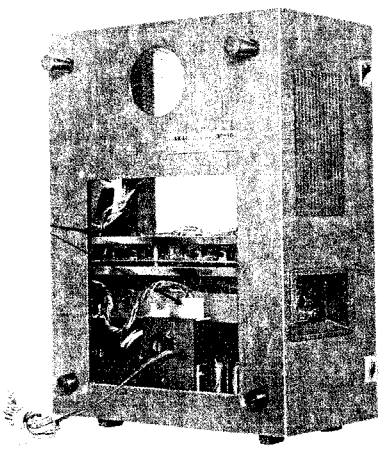


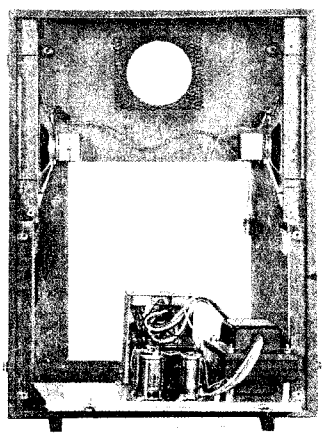












V. TRANSPORT MECANISM

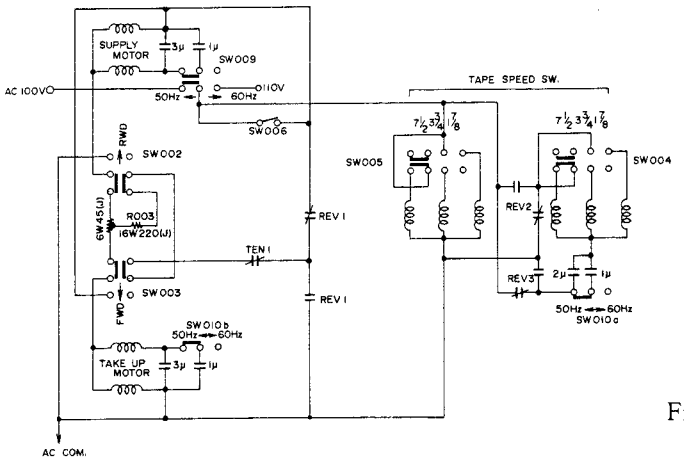


Fig. 5-1

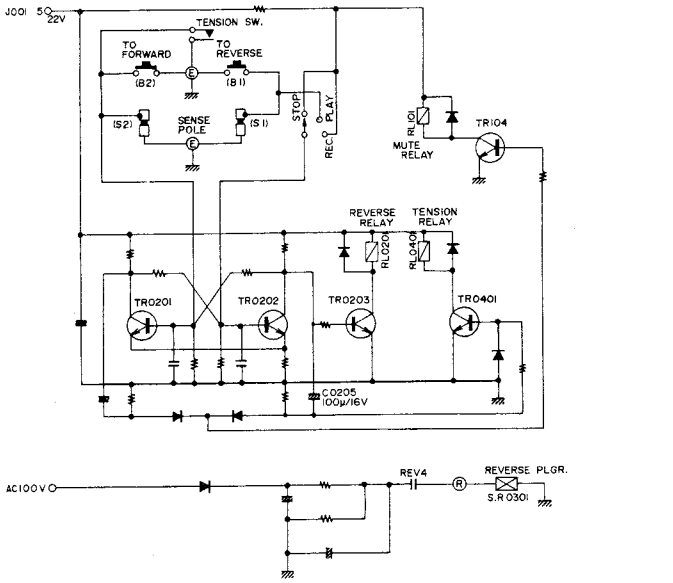


Fig. 5-2

1. SUPPLY VOLTAGE OF BOTH TORQUE MOTORS DURING RECORDING/PLAYBACK

	SUPPLY	TAKE-UP
Normal Play	30 V (50 to 60 gr)	60 V (180 gr)
First 4 to 8 severse	47 V (100 gr)	47 V (100 gr)
Reverse	60 V (180 gr)	30 V (50 to 60 gr)
RWOFF	100 V	100 V

2. PINCH ROLLER PRESSUR 1.5 Kgr TO 1.8 Kgr.

Recording/Playback (Normal Recording)

Set Recording/Playback Knob (A) to Playback Position. The Pinch Roller presses against Capstan to move the tape at the rated speed. The Brake Levers free the Brake and the Lever Spring (G) turns "ON" Microswitch (SW006) (F) so that both torque motors become operative (at shown in diagram illustration).

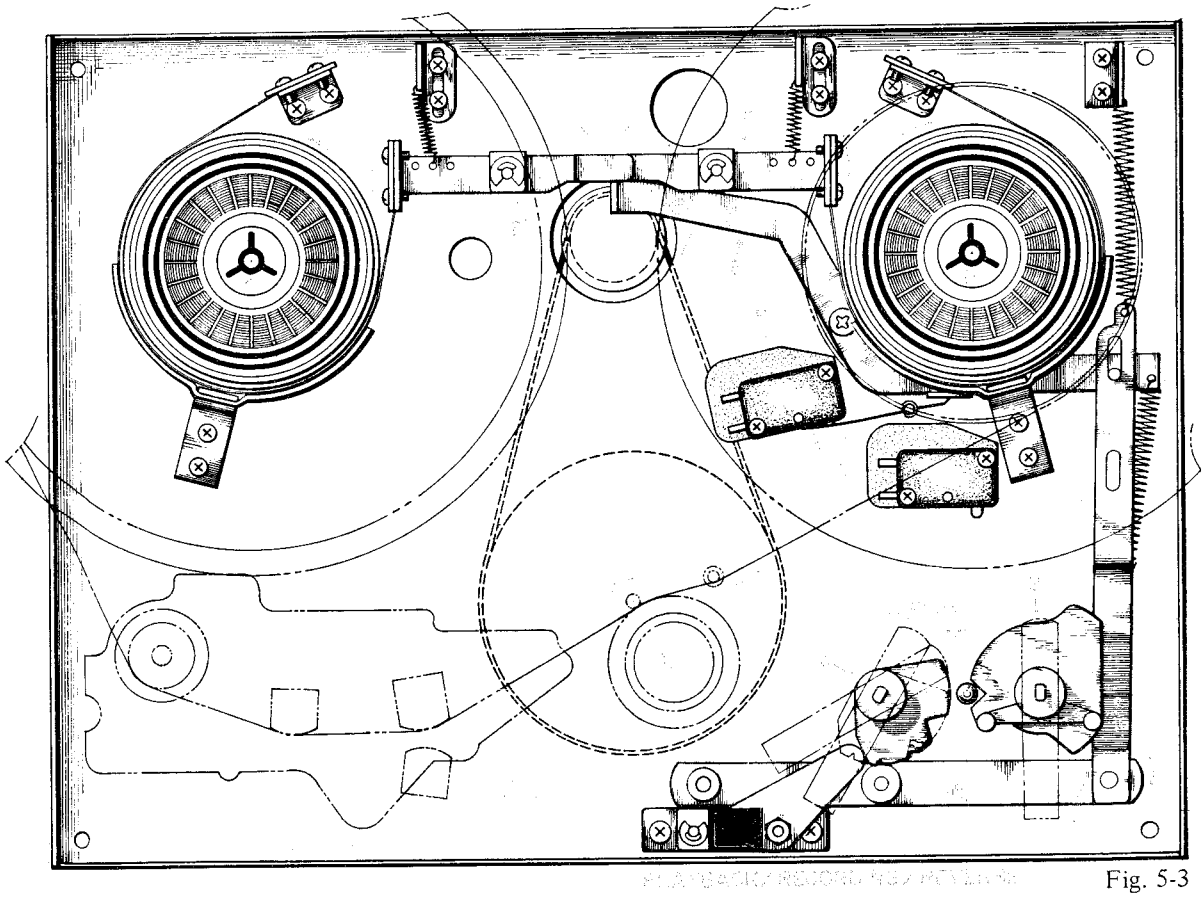


Fig. 5-3

3. REVERSE (BLOCK DIAGRAM ILLUSTRATION)

At Playback position, when Reverse button (B) is depressed or the sensing tape passes the sensing pole

At Playback position, when Reverse button (B) is depressed or the sensing tape passes the sensing pole (S_1), the base of TR0202 is grounded. The operation of TR0202 is stopped and the voltage sent to the base of TR0203 and operates it. Reverse Relay RL0201 is actuated and Reverse is effected.

At the same time, the discharge current of Condenser C0205 (100M/16V) actuates TR0401 and TR104 which assume operating position within a period of from 4 to 8 seconds.

Tension Relay (RL0401) is actuated and a higher voltage than during reverse playback time (47 V) is supplied to the Take-Up torque motor. At the sametime Mute Relay (CRL1017) mutes the playback output signal.

Plunger (SR0301) operates and lowers the playback head.

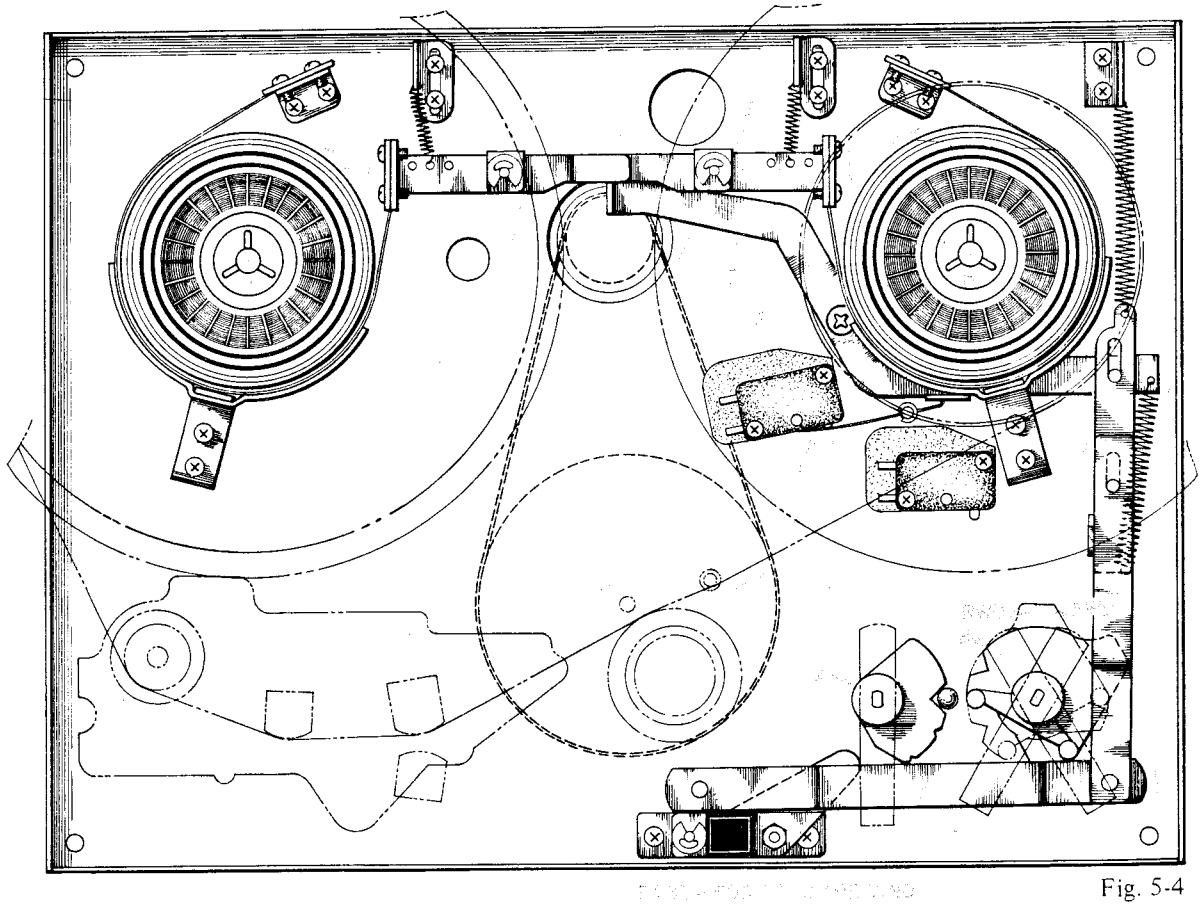


Fig. 5-4

4. FAST FORWARD

When Fast Forward/Rewind Knob is set to Forward position, SW003 (block diagram) enters forward position. Brake Levers (E) (E) free brake. Lever Spring (G) turns "ON" Microswitch (F) and the TAKE-UP Torque Motor rotates.

5. REWIND

When Fast Forward/Rewind Knob is set to Rewind position, SW002 (block diagram enters rewind position. Brake Levers (E) (E) free Brake. Lever Spring (G) turns "ON" Microswitch (F) and the SUPPLY Torque Motor rotates.

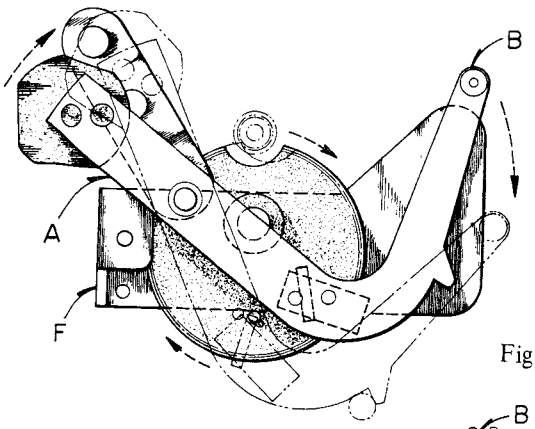


Fig. 5-5

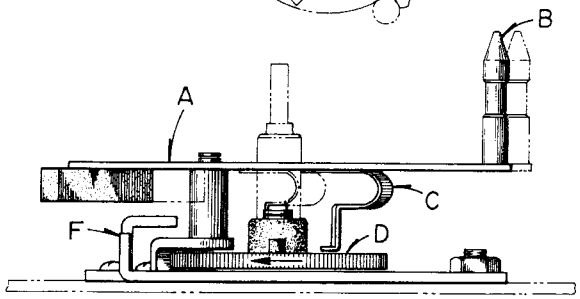


Fig. 5-6

AUTOMATIC STOP MECHANISM

When the tape is threaded on pin (B), if the tape is accidentally broken or comes to the end, Automatic Stop Lever (A) drops to its original position.

When the tape is broken or comes to the end, Plate Spring (C), located below the Automatic Stop Lever, depresses a projected pin on Eccentric Gear (D). Eccentric Gear (D) gears into Flywheel (E) to begin rotation of the Eccentric Gear. This rotating action operates Lever (L), which is connected to the base of the Eccentric Gear, and pushes up Instant Stop Lever (G). When Instant Stop Lever (G) is lifted, Shut-Off Lever (J) contacts Micro Switch (K) and the current supply is cut off. Thus, automatic stop control is provided in Recording and Playback modes.

In Fast Forward and Rewind modes, the same operation takes place except that Lever (H) works to push back the FF, Rewind Shaft to "Stop" position.

(See Figs. 5-5 to 5-8)

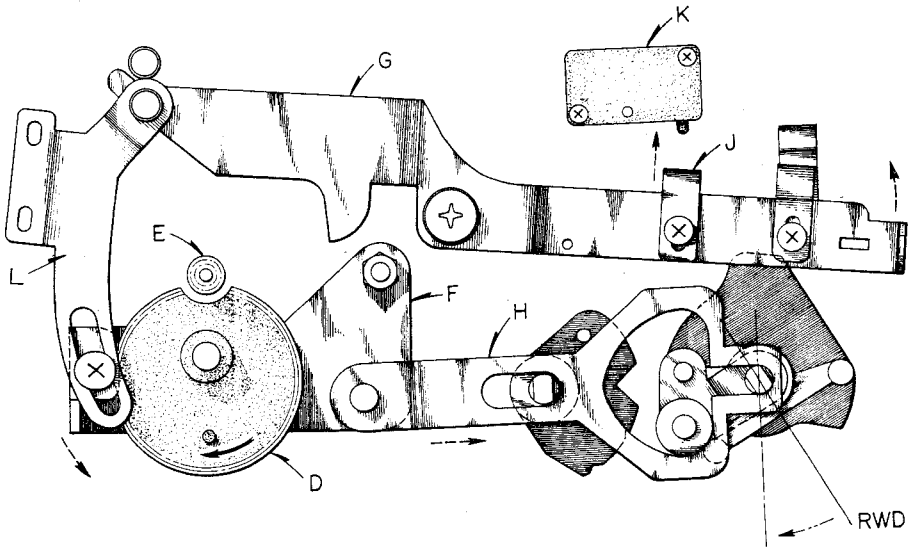


Fig. 5-7

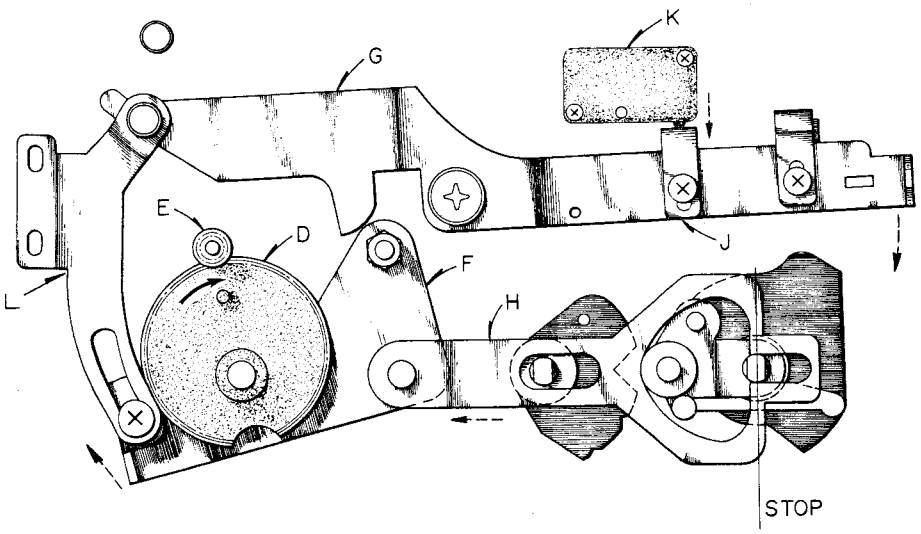


Fig. 5-8

ILLUSTRATION OF 4TR X-FIELD HEAD

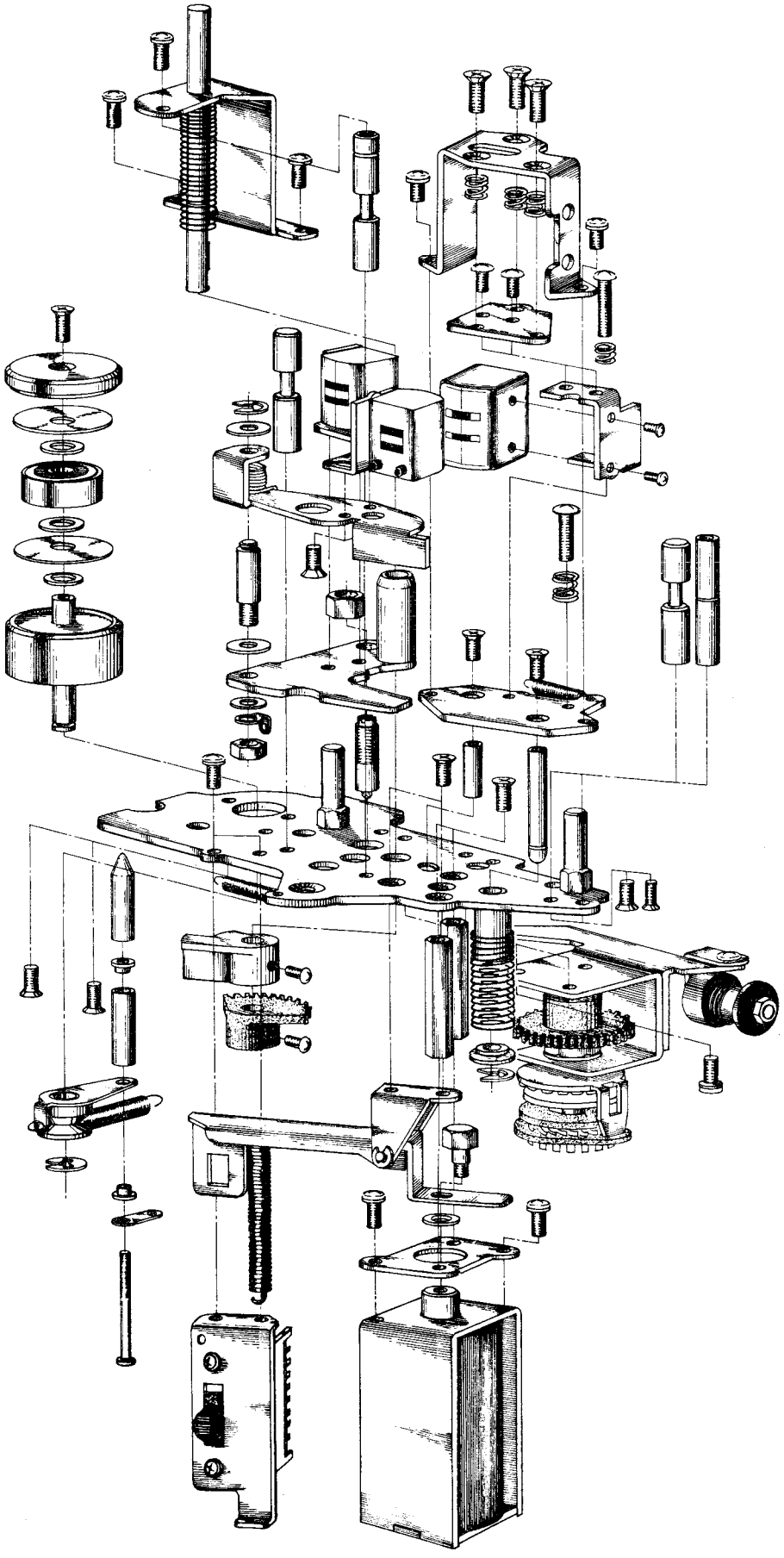


Fig. 6-1

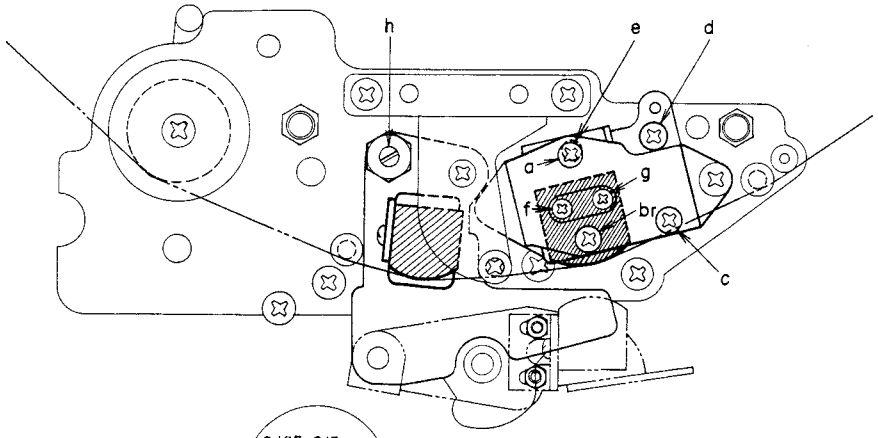


Fig. 6-2

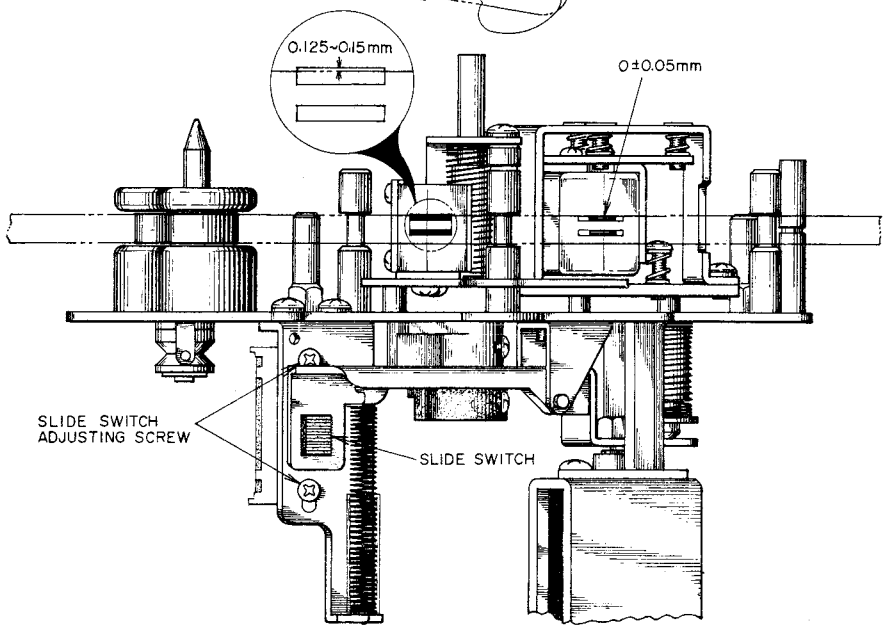


Fig. 6-3

1. ADJUSTMENT OF HEAD HEIGHT (SEE FIGURES 6-2AND 3).

1) To adjust, turn screws (a) (b) (c) (Fig. 6-2)
During "Normal Play" position so that theupper edge of the upper core of the Playback/Rec Head is the same height as the upper edge of the tape.
Adjust by turning screw (d) (Fig. 6-2) during "Reverse Play" position so that the lower edge of the lower core of the Playback/Rec Head is the same height as the lower edge of the tape.

2) Erasing Head
Adjust screw (H) so that the upper edge ofthe upper core is 0.125 to 0.15 mm higher than the upper edge of the tape. In adjusting Head Height, make sure that the front of the Head is at right angles to the Chassis and that the upper and lower part of the Head firmly contacts the tape.

2. ADJUSTMENT OF AZIMUTH ALIGNMENT

1) Playback/Rec Head
Use a pre-recorded tape (16 KHz, 7-1/2 ips), and connect a high sensitivity V.T.V.M. to the line output jack. Adjust screws (c) (e) so that line output voltage is maximum.

2) Erasing Head
Visually check to assure that the center line of the Erasing Head is at right angles to the Head Chassis.

ILLUSTRATION OF REEL TABLE AND REEL MOTOR BLOCK

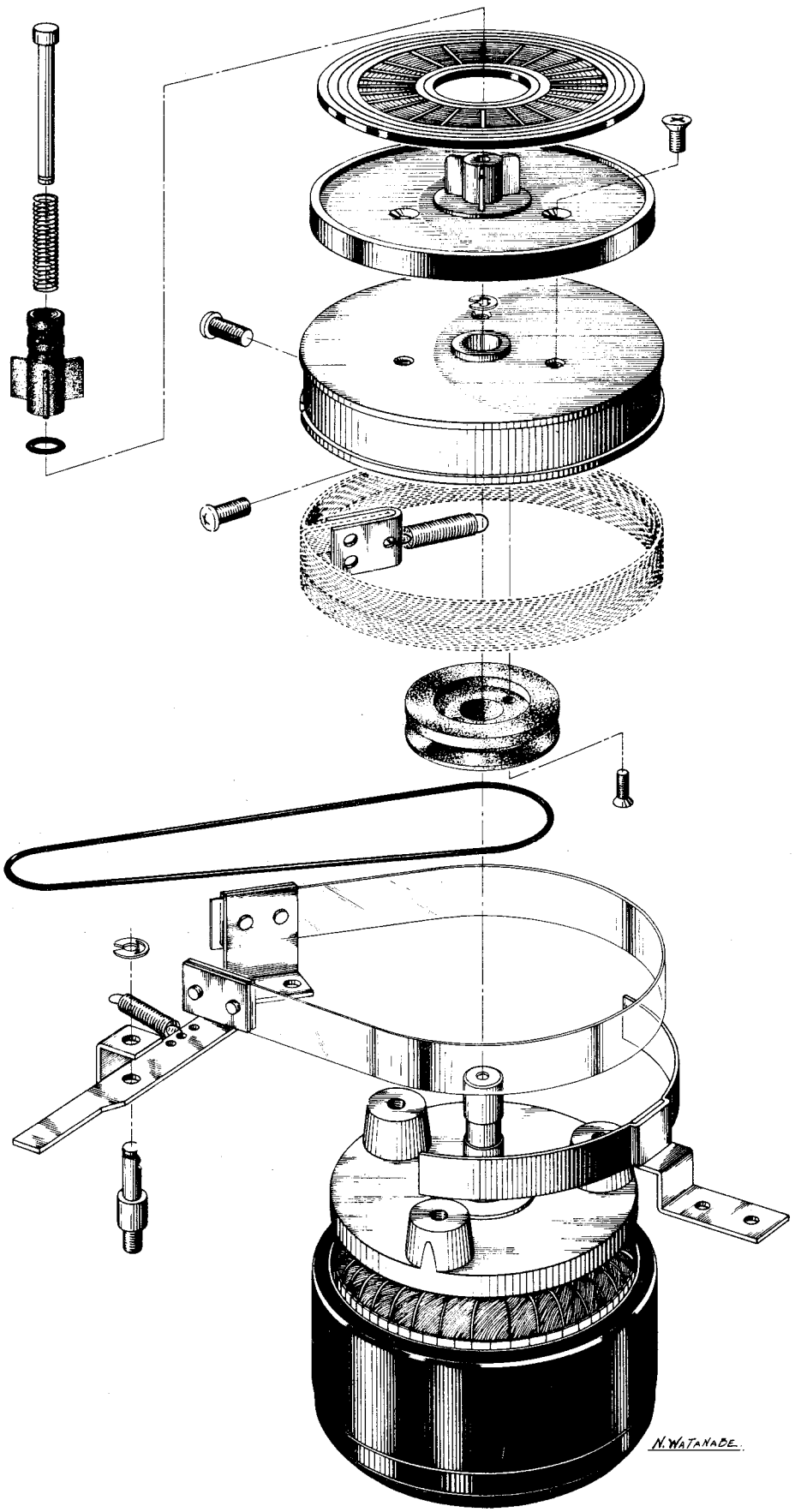


Fig. 6-4

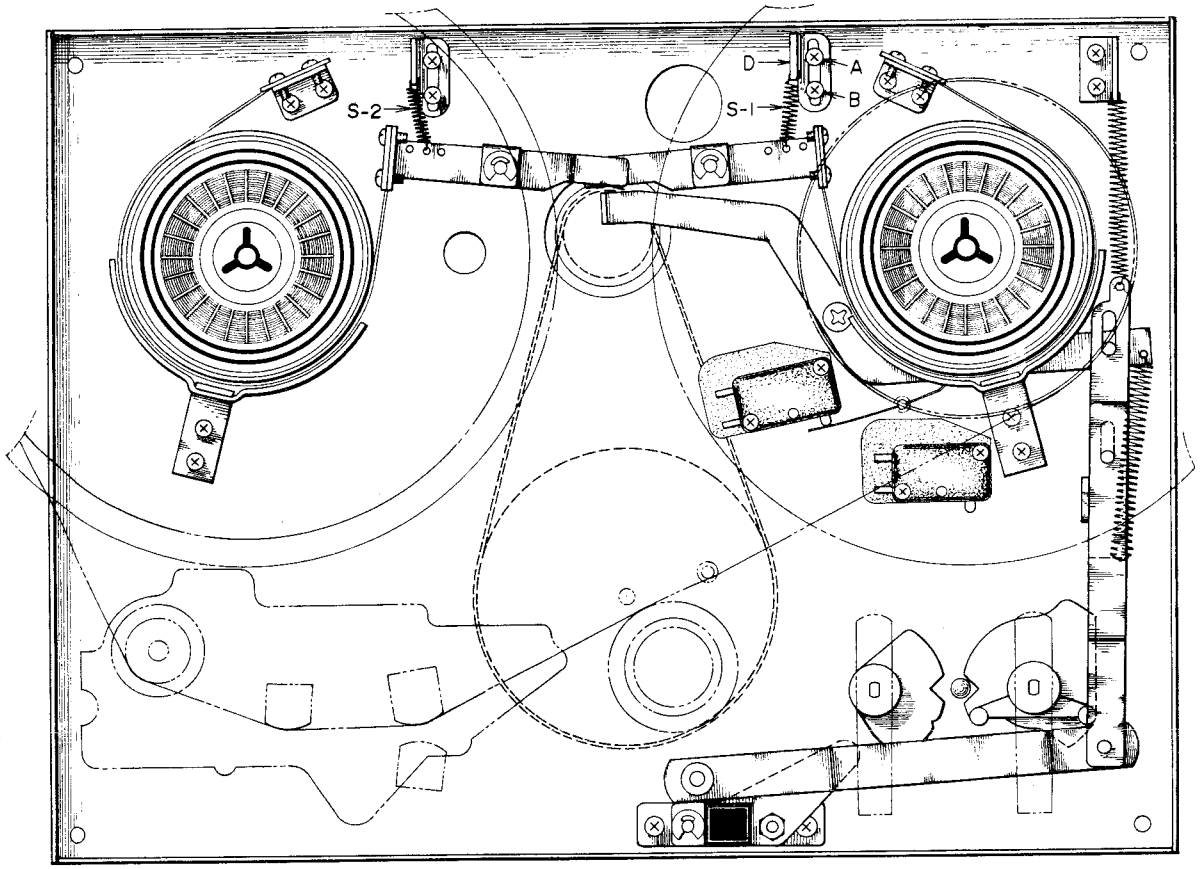


Fig. 6-5

BRAKE ADJUSTMENT

Using a Tension Gauge, and a 60 mm tape wound on a 5" Reel, measuring can be done as per drawing. Measure the brake tension as shown in the drawing. 300 gr is standard.

To regulate tension, change the position of the suspended springs (S_1 and S_2 in Fig. 6-5) or loosen screws (A) (B) and regulate position of the spring suspension metal fitting (D).

REEL HEIGHT ADJUSTMENT (SEE DIAGRAM ILLUSTRATION)

Loosen Reel Table Screws and regulate height.

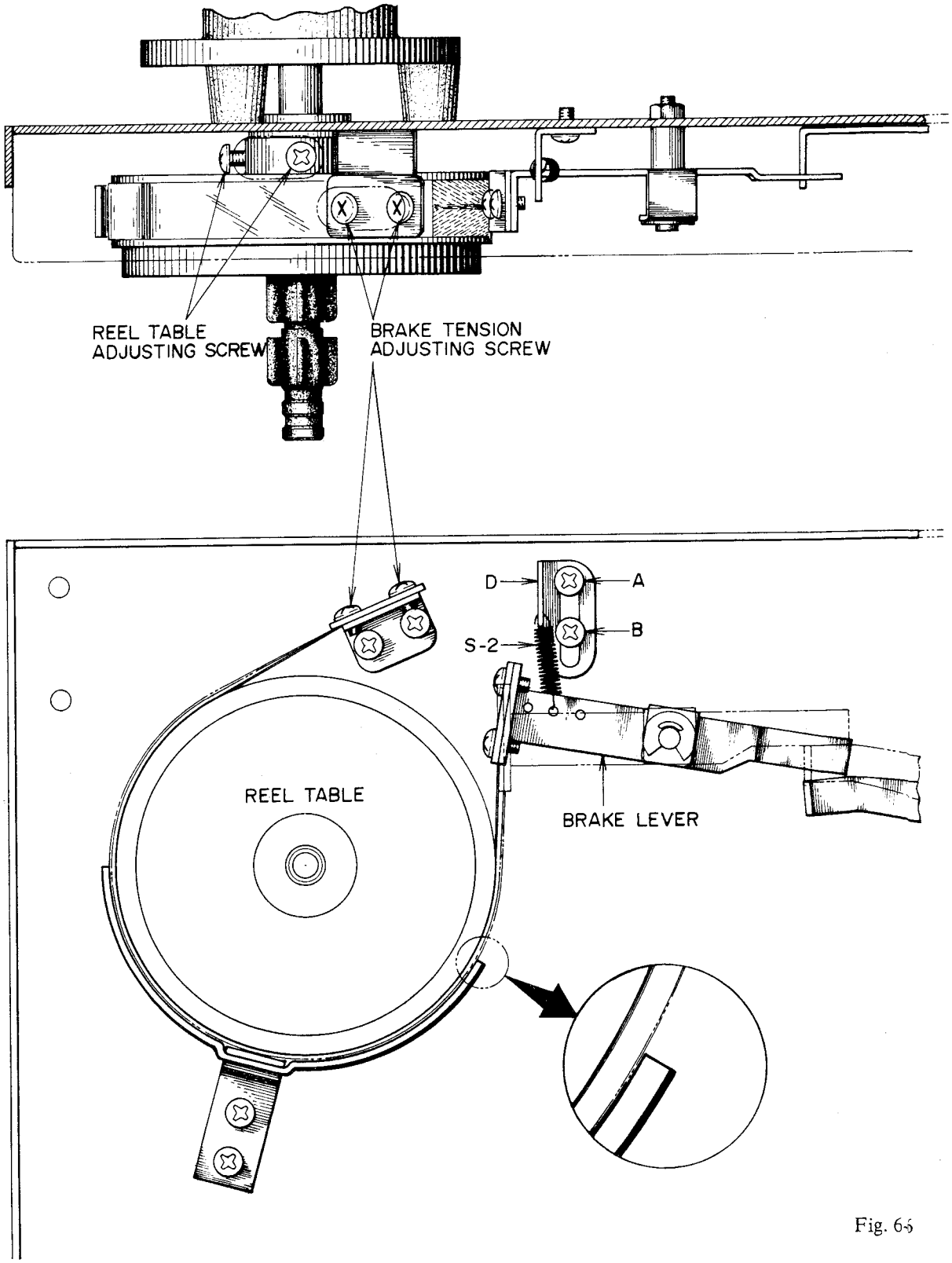


Fig. 6-5

ILLUSTRATION OF MAIN MOTOR BOLCK

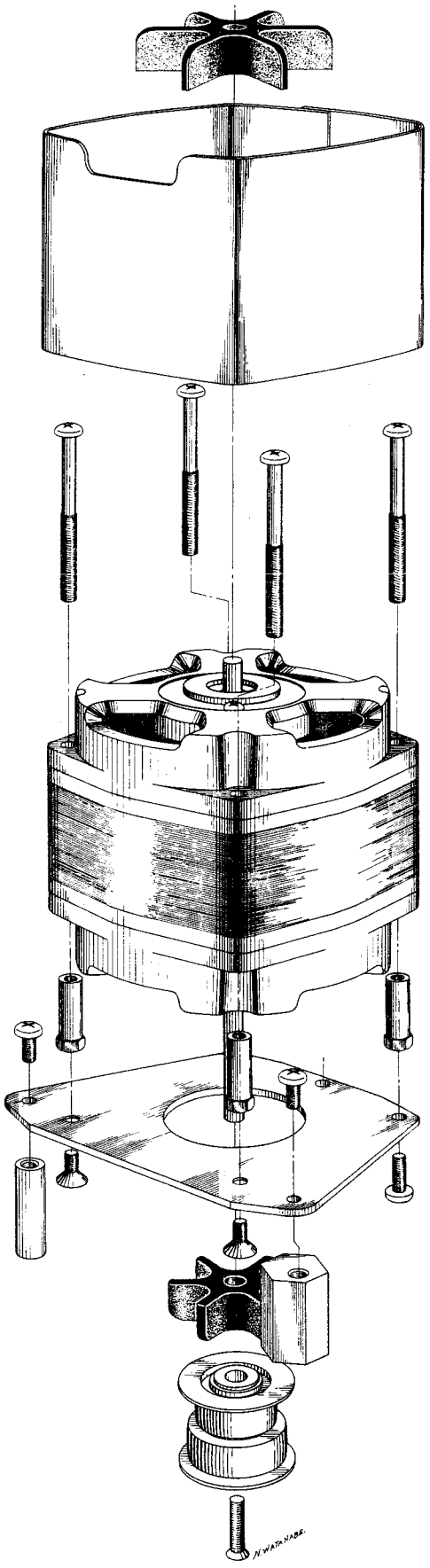


Fig. 6-7

ILLUSTRATION OF SWITCH LEVER BLOCK

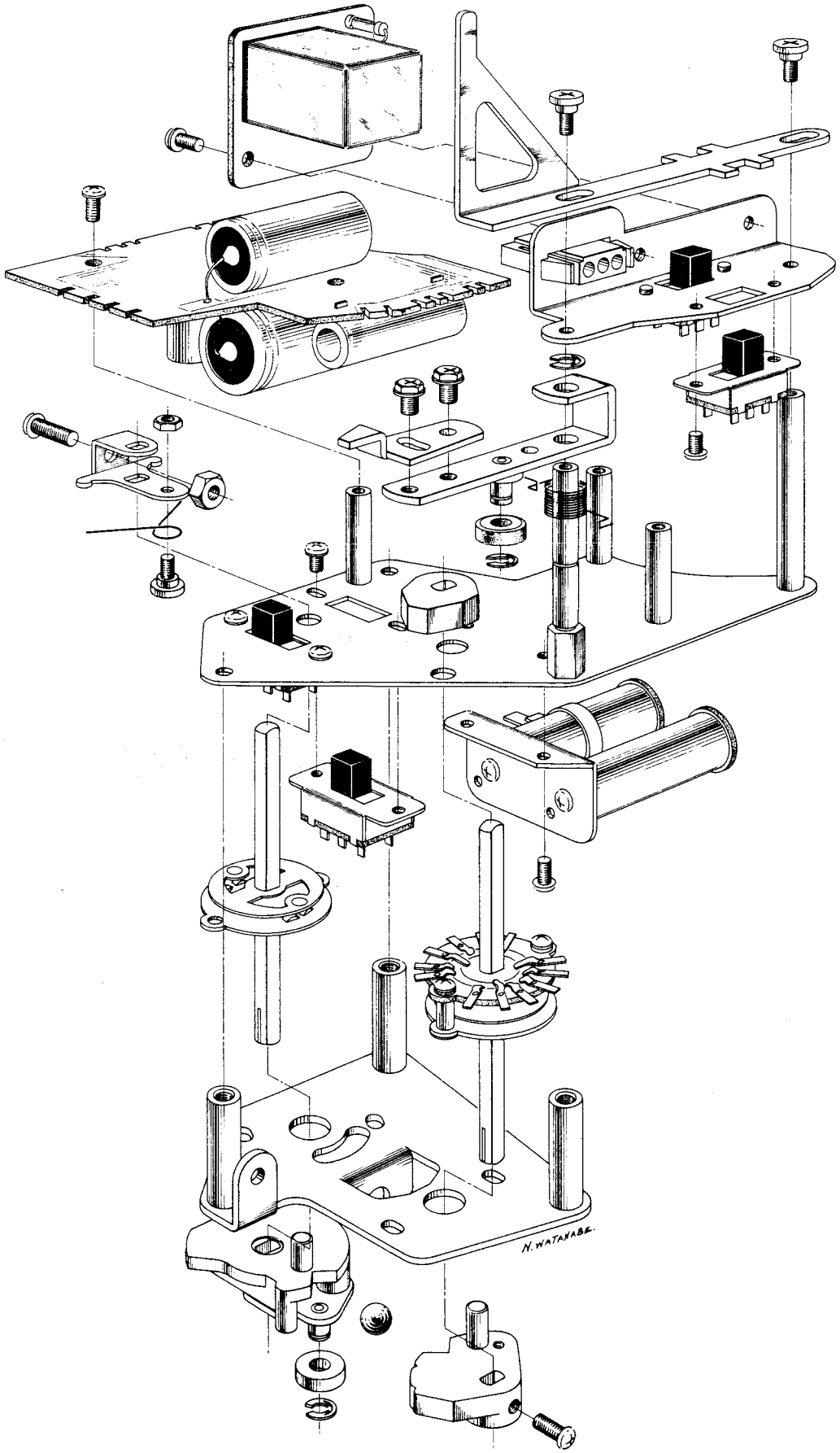


Fig. 6-8

ILLUSTRATION OF FLYWHEEL BLOCK

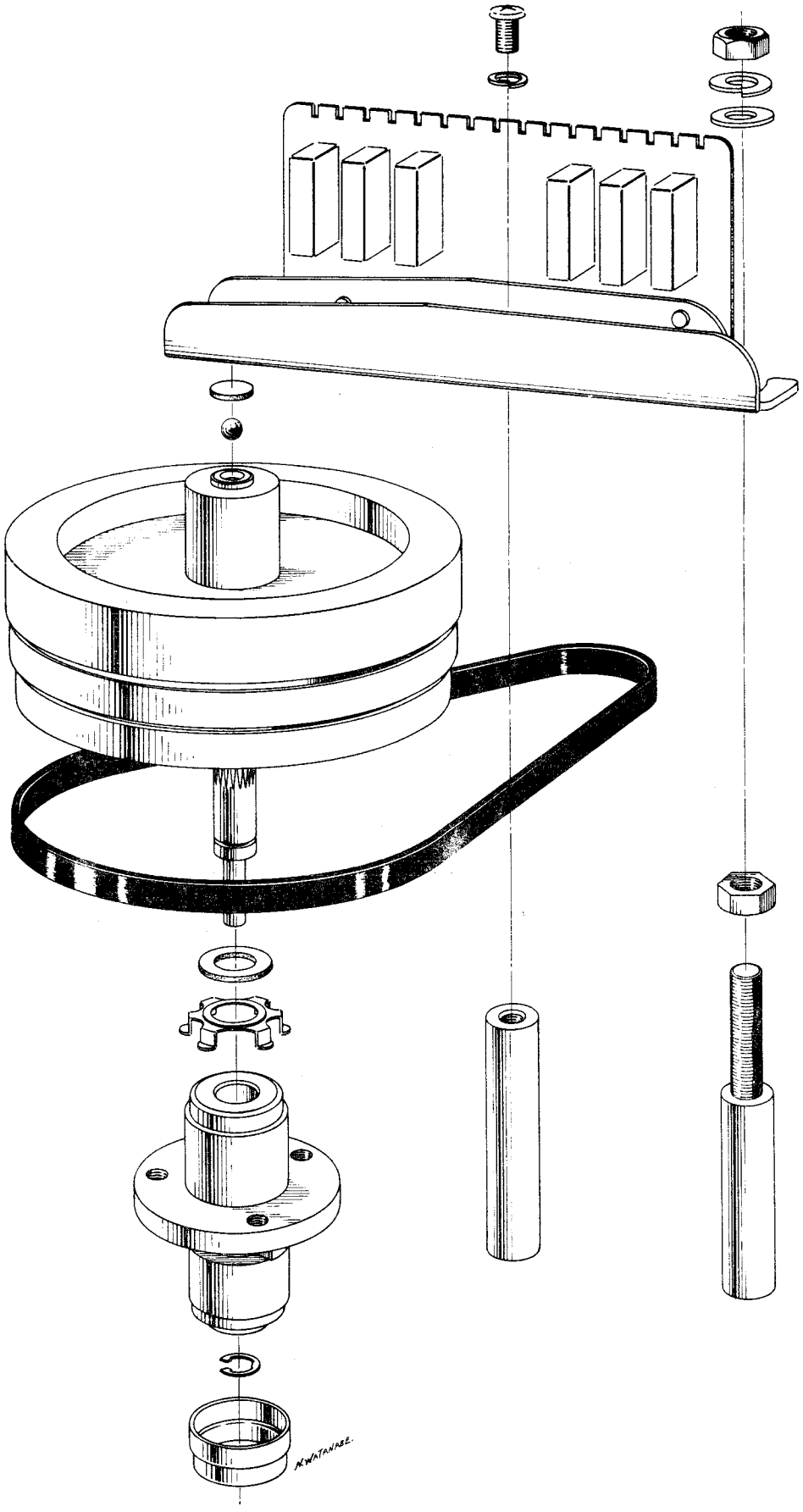


Fig. 6-9

VII. AMPLIFIER ADJUSTMENT

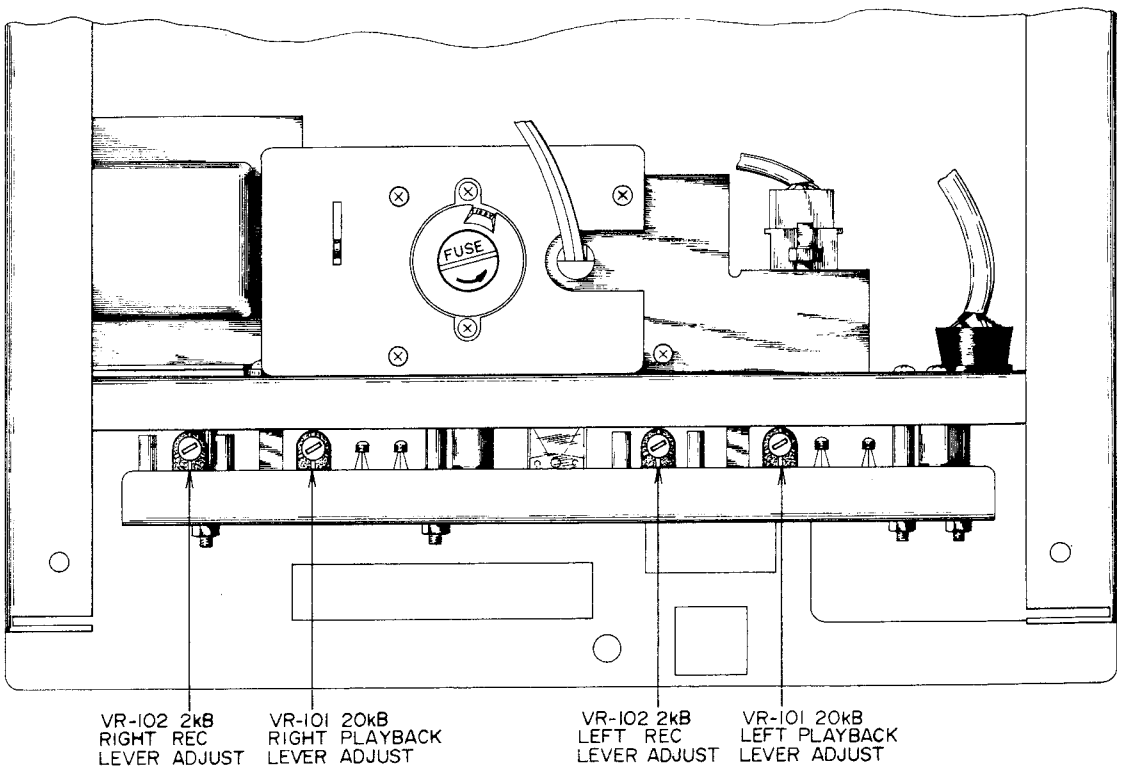


Fig. 7-1

1. PLAYBACK OUTPUT LEVEL (PRE-AMPLIFIER) ADJUSTMENT

a) Connect a high sensitivity V.T.V.M. to the Line Output Jack.
b) Set the Tape Speed Selector Switch to the "7-1/2" position.
c) Playback at 250 Hz pre-recorded tape.
d) Adjust the VR 101 (semi-fixed resistor 20 K-B, Fig. 7-1) of the pre-amplifier so that Line Output Voltage indicates 1.228 V (± 4 dbm).

2. ADJUSTMENT OF RECORDING LEVEL

Recording Amplifier Adjustment should be made only after Head Adjustment (vertical and horizonatal azimuth) and Playback Amplifier Adjustments have been made.

1) As shown in Fig. 7-2, connect an Audio Oscillator and Attenuator to the Line Input. Connect a High-sensitivity V.T.V.M. to the Line Output.
2) Set Equalizer Switch and Tape Speed Selector to "7-1/2".
3) Load a blank test tape (Scotch No. 150) on the tape recorder and set the Rec/Playback Knob to "Rec" position.
4) Supply a 1000 Hz signal from the audio oscillator to the Line Input, and adjust the volume control so that the VU Meter indicates "O" VU (intermediate between red and black).
5) Record the tape and check playback to see whether the VU Meter indicates "O" VU.
6) If the pointer of the VU Meter fails to register "0" VU, repeat recording and playback by adjusting the semi-fixed resistor VR 102 (2 KB) on the recording pre-amplifier until the "0" VU reading is obtained both on recording and playback.

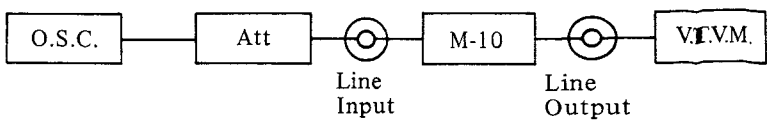


Fig. 7-2

3. ADJUSTMENT OF RECORDING BIAS FREQUENCY AND VOLTAGE

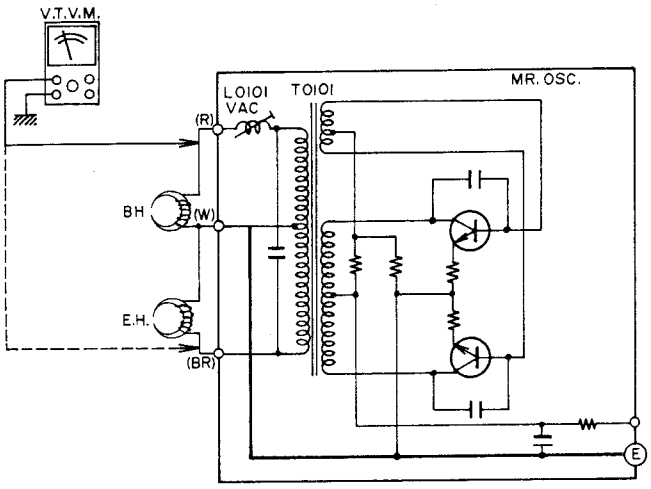


Fig. 7-3

Proper bias Frequency of the X-200D is 95 KC (±5 KC). The frequency can be adjusted by conveerting the value of the condenser (C.104 1000p) and L0101 (VAC).
Proper Bias Voltage is 105 V (±2 V). The voltage can be adjusted by turning the V.A.C. (L0101) in the bias oscillator circuit.

Erasing Voltage is 90 V (±5 db).

4. ADJUSTMENT OF D.C. BIAS CURRENT OF POWER OUTPUT TRAUSISTORS WITH NO INPUT SINGNAL (SEE FIG, 7-4)

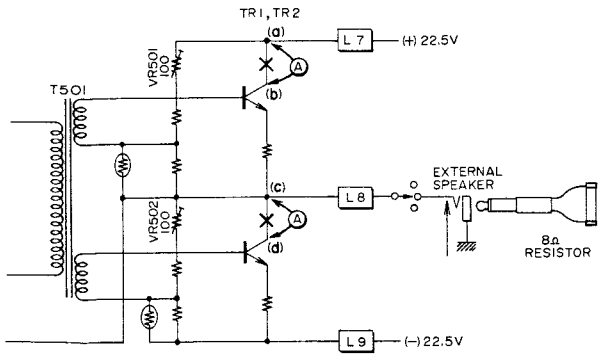


Fig. 7-4

1) Disconnect collector wire of Transistor TR1 and TR2
2) Connect the Ampere Meter (maximum scale 250 mA) to the collector circuit (a)and (b), (c) and(d)
3) Connect the 8 Ω resistor to the External speaker Jack
4) Turn the Volume control back to the minimum position
5) Adjust the potentiometer VR501 and VR502 (100 Ω) until the Collector Current reahes 35 ~ 40 mA

Caution : It is important that the potentiometer be adjusted so that both meters indicate equal levels.

5. ADJUSTMENT OF THE LEVEL CONTROL VR601

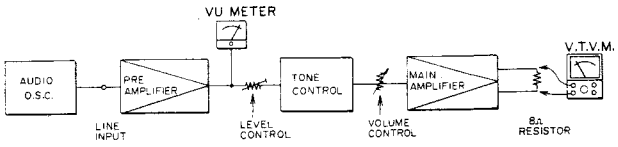


Fig. 7-5

1) Connect Audio Oscillator to the Line input and supply 1000 Hz sine wave
2) Set Record Level control so that the VU meter indicate "O" VU
3) Connect 8 ohms (10 W) resistor to the External speaker Jack
4) Connect V.T.V.M. across 8 ohms resistor
5) Turn the Volume Control up to the maximum position
6) adjust Level Control potentiometer so that Output Voltage reaches 8 volts.

VIII. MAINTENANCE PROCEDURES

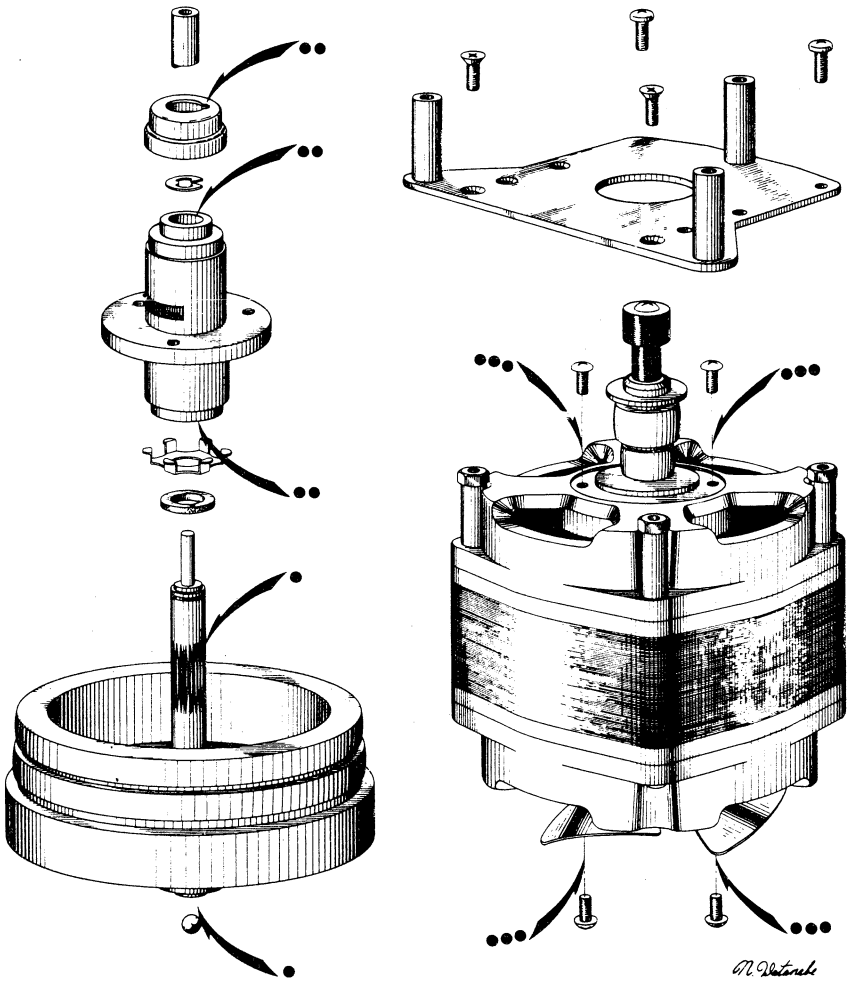
1. LUBRICATION INSTRUCTION

For maximum service life and optimum performance, lubricate the parts identified below after each 500 hours of operaiton. Use only light machine oil of good quality;

Motor
Flywheel Assemble
Pinch Whell'. . . . . 1 drop

Also apply a liberal film of light machine grease to each roller surface of all levers and came.

CAUTION : DO NOT OVER-LUBRICATE. WIPE OFF EXCESS OIL WITH A COTTON SWAB SOAKED IN ALCOHOL. OTHERWISE, THE EXCESS LUBRICANT MAY BE SCATTERED DURING OPERATION. AND THE RUBBER COMPONENT PARTS WILL DETERIORATE.



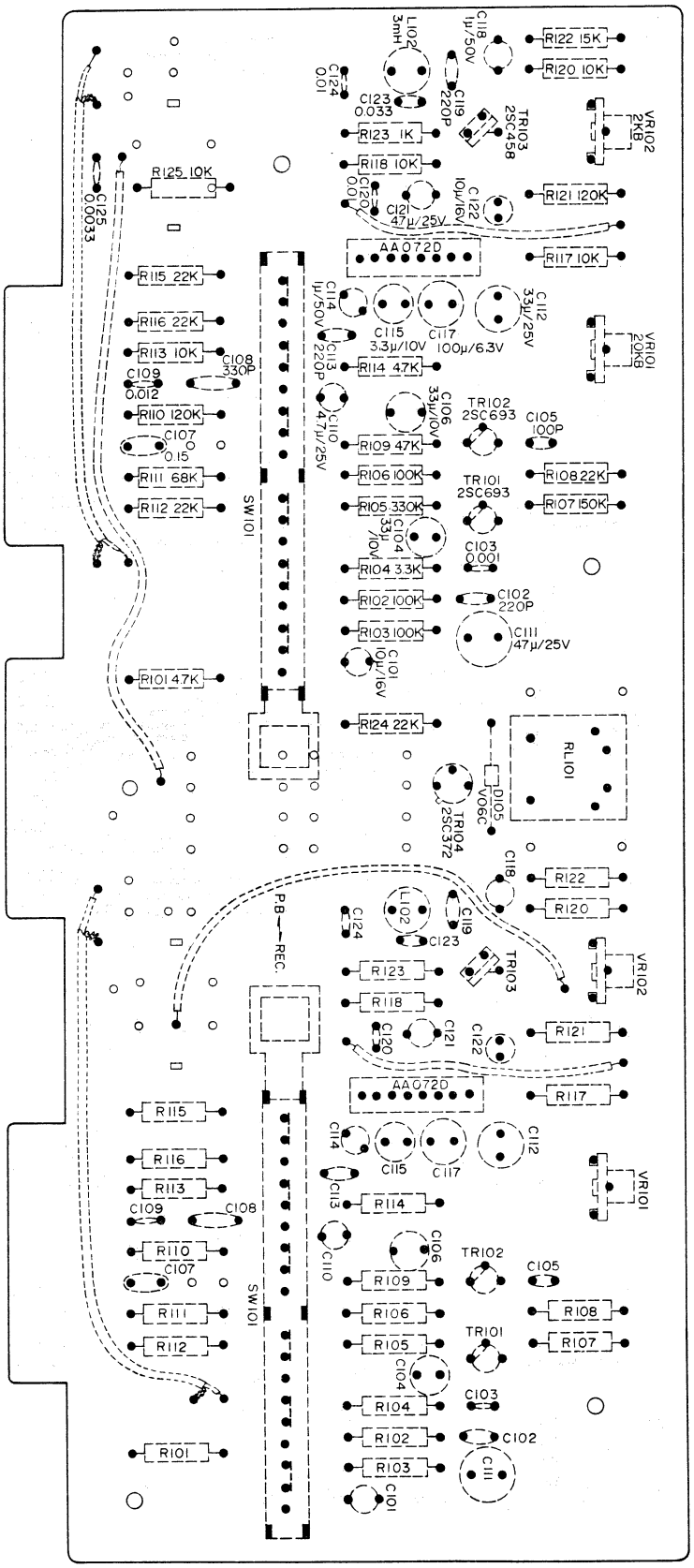
FLYWEEL ● 1 drop MOTOR

2. CLEANING TAPE HEADS AND OTHER PARTS

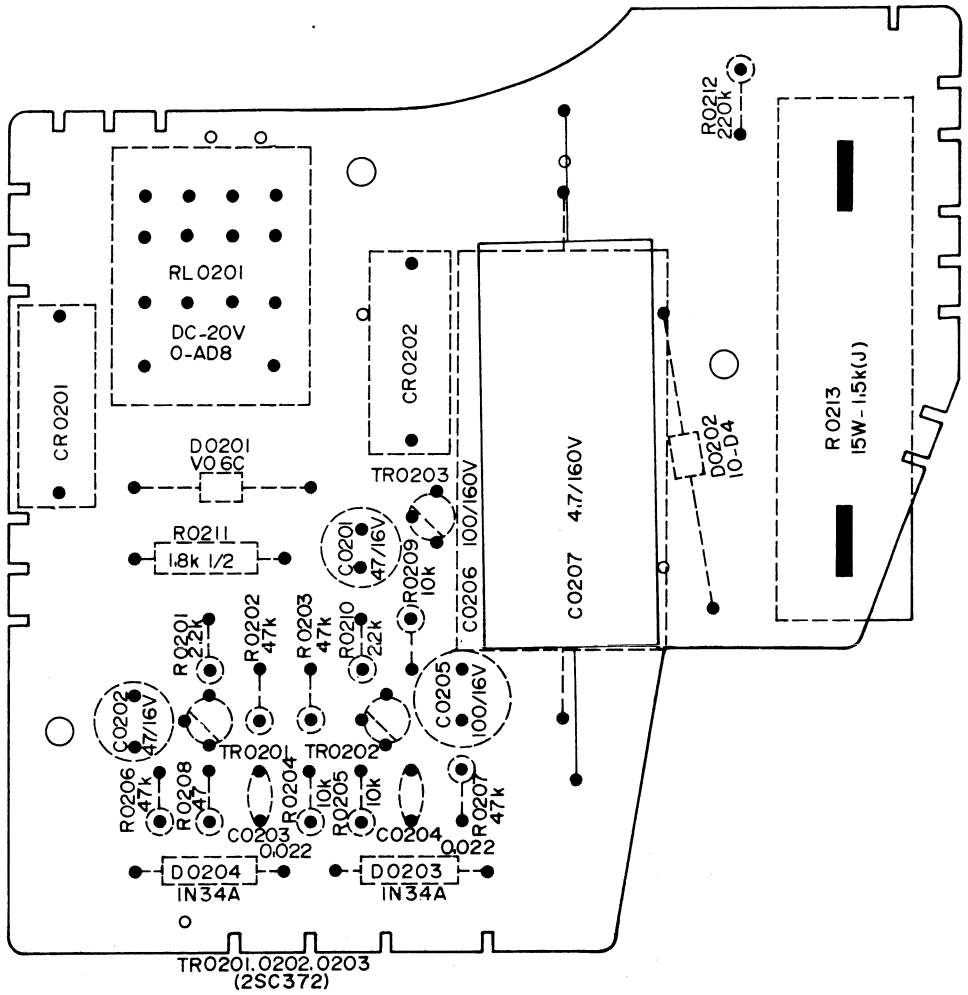
Wipe surface of tape heads, guide roller bearing, capstan bushing and pinch wheel periodically with a soft cloth soaked in alcohol or carbon-tet.

IX. COMPOSITE VIEWS OF COMPONENTS

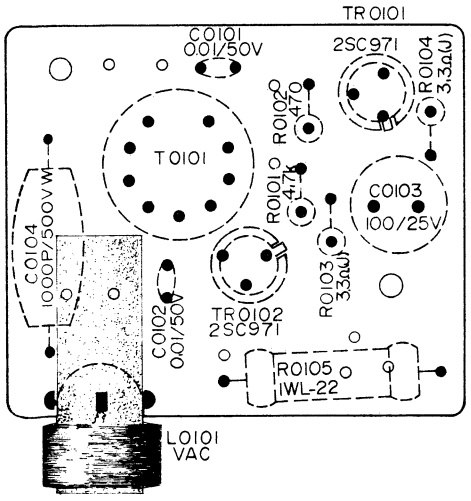
PRE AMP. PRINTED CARD (MRA-501)



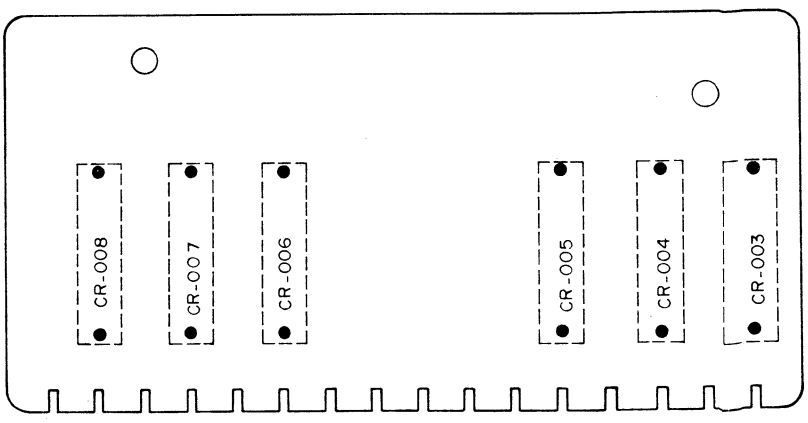
SYSTEM CONTIROL PRINTED CARD (MR-504)



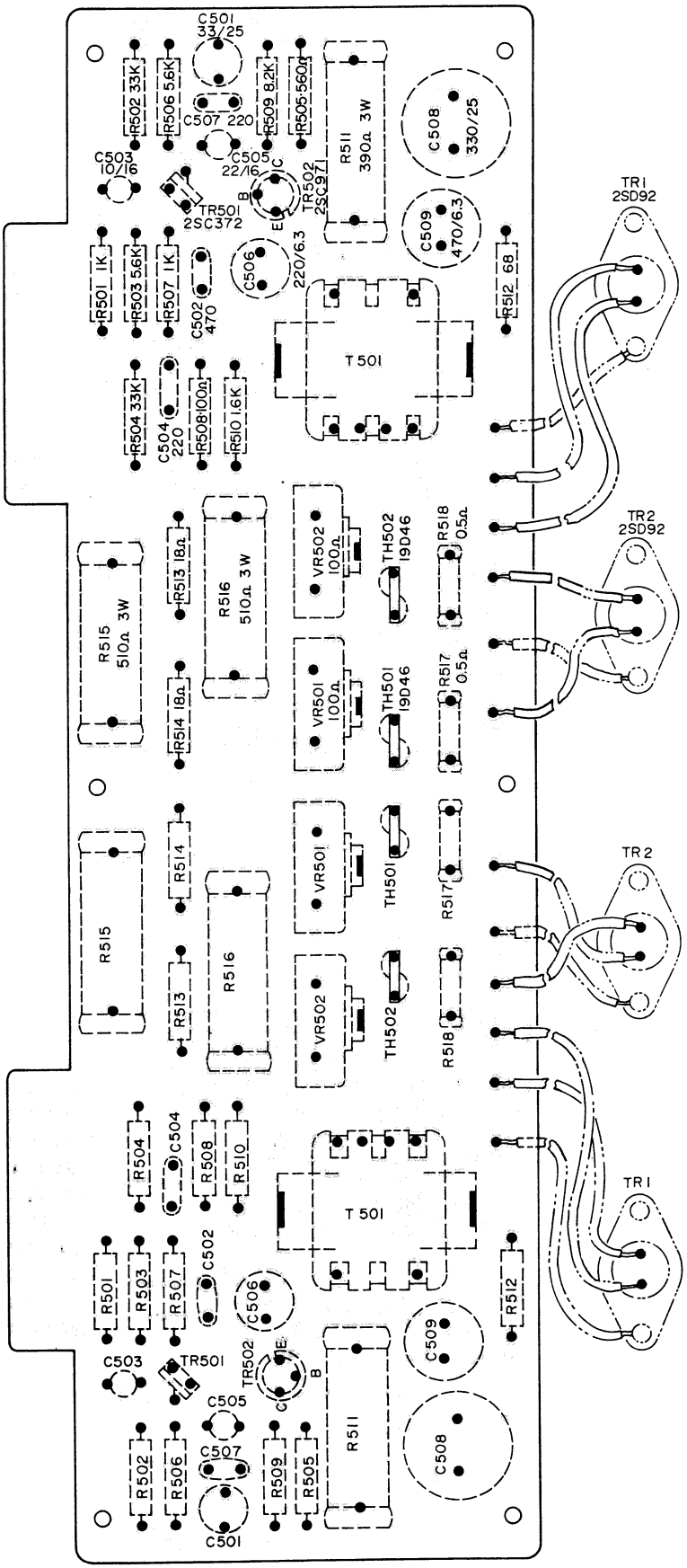
O.S.C. PRINTED CARD (MR-505)



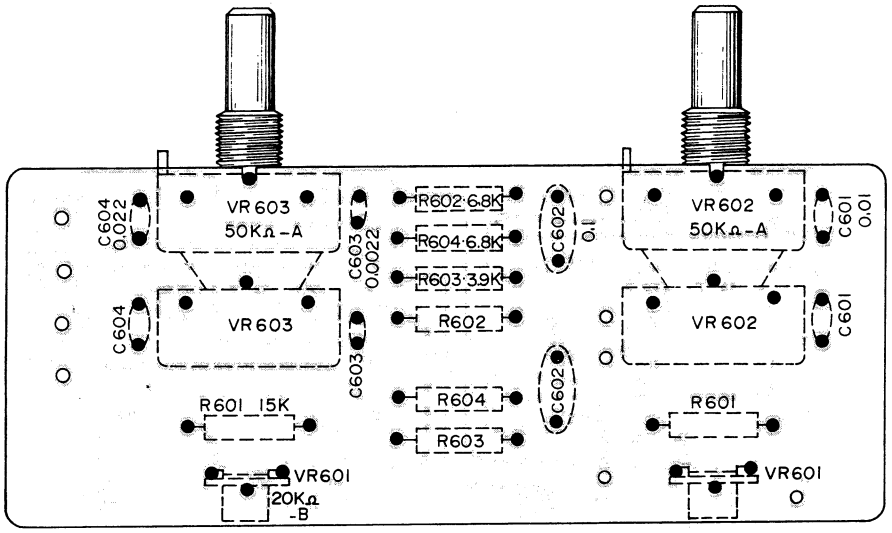
SPARK QUENCHER PRINTED CARD (MR-507)



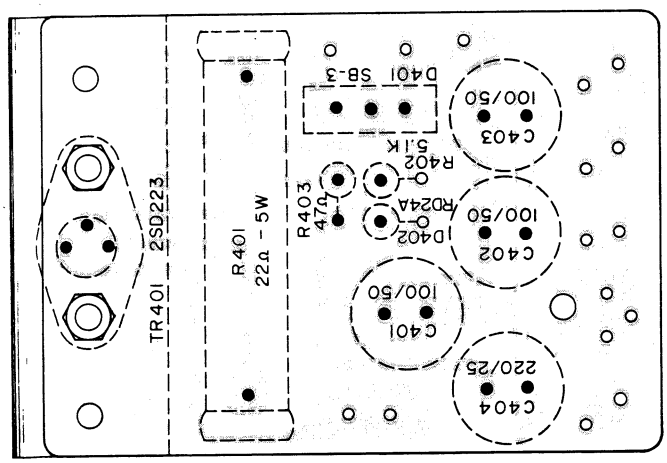
MAIN AMPLIFIER PRINTED CARD (MRA-508)



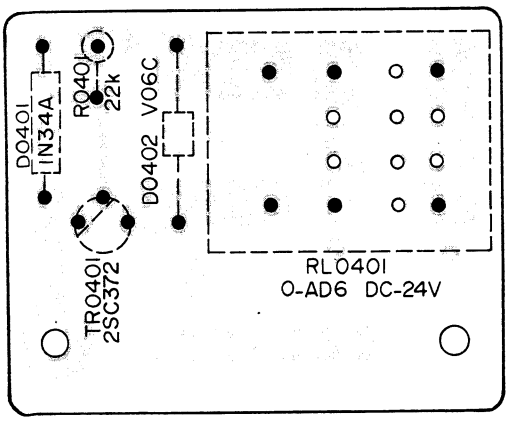
TON CONTROL PRINTED CARD (MRA-509)

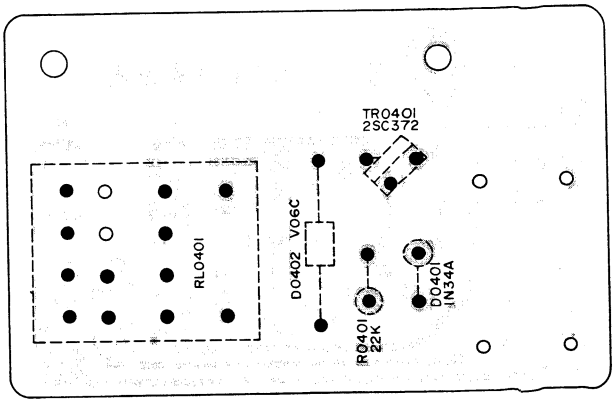


POWER SOURCE PRINTED CARD (MRA-510)



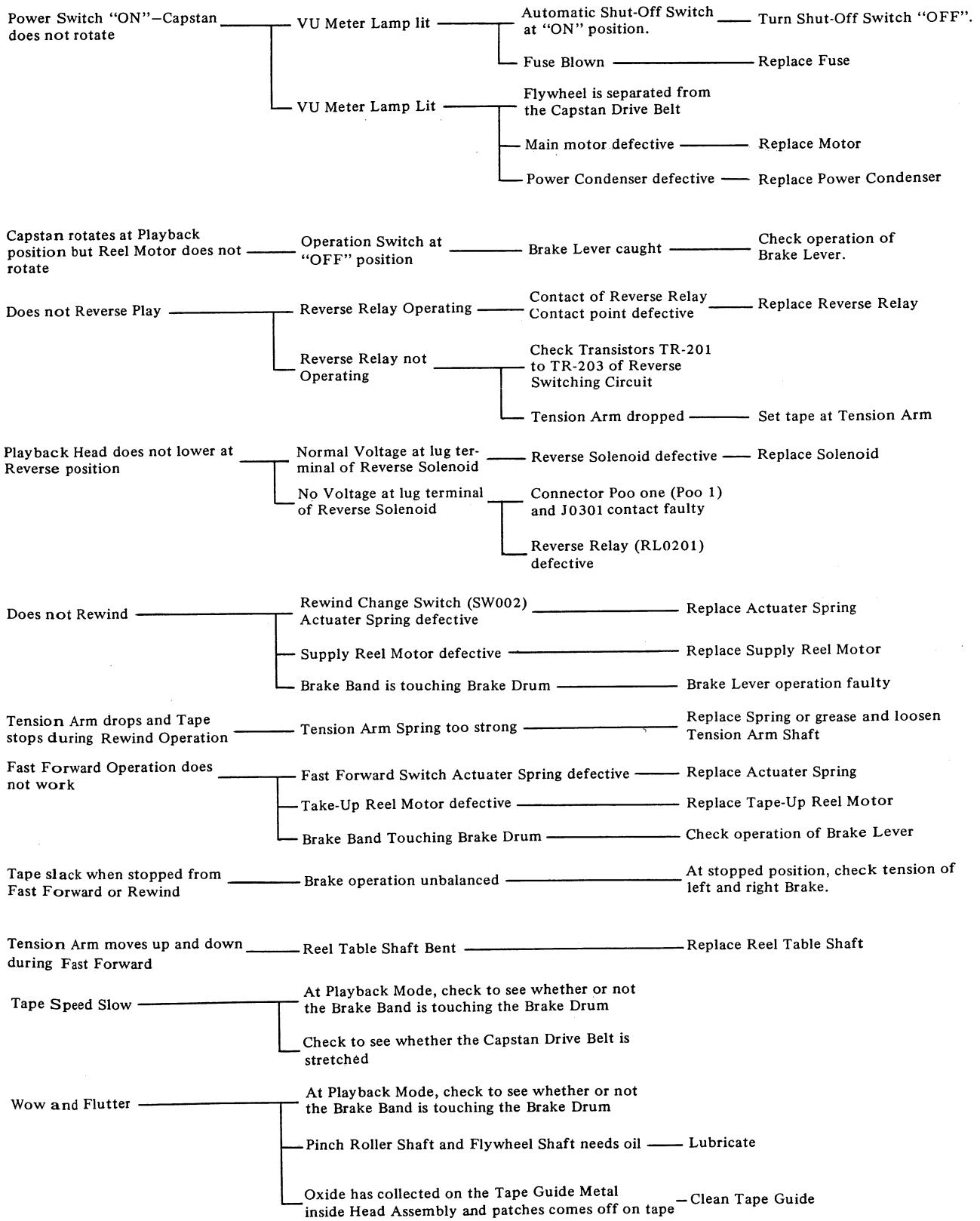
TENSION RELAY PRINTED CARD (MR-552, 558)





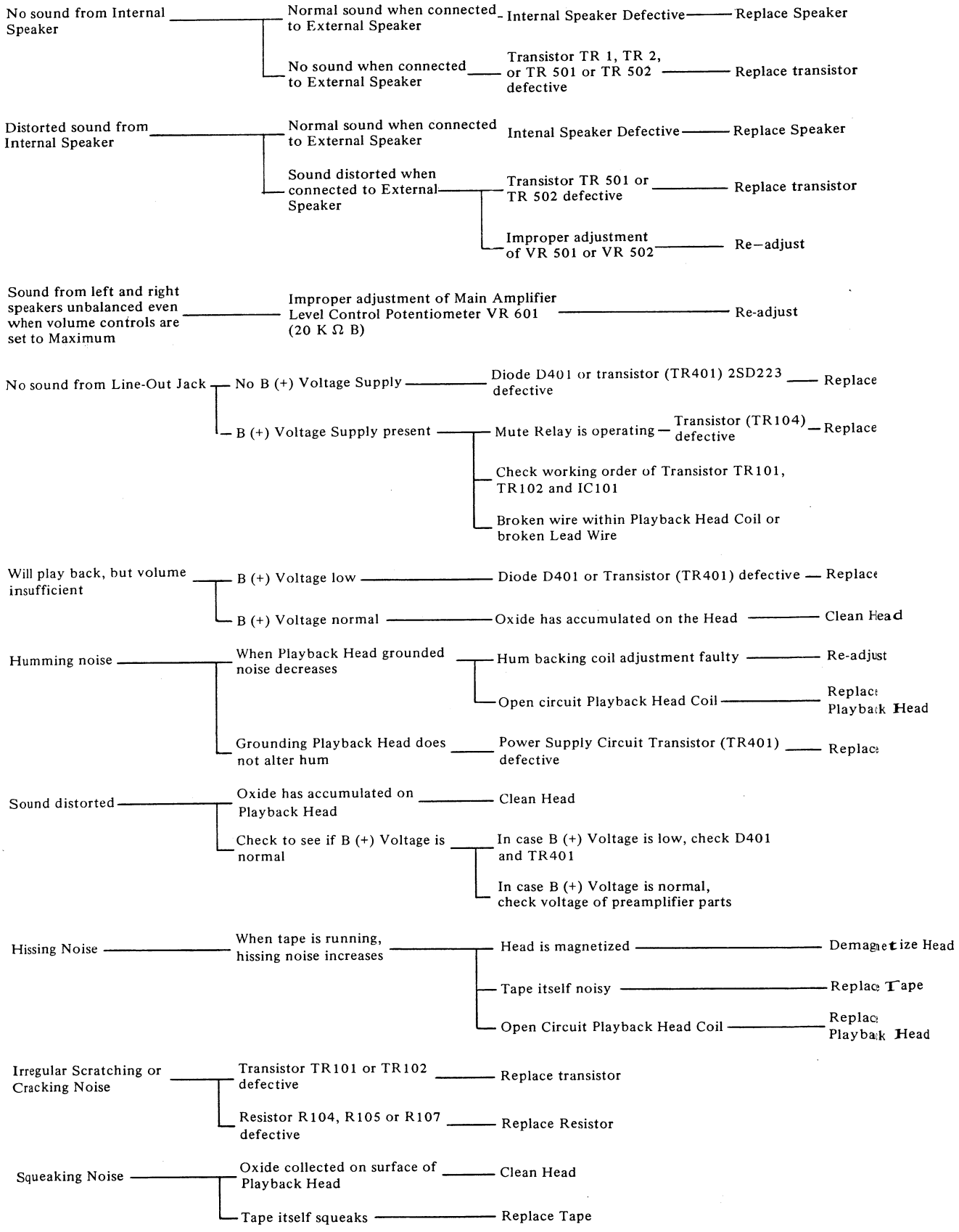
X. TROUBLE SHOOTING CHART

SECTION "A" TROUBLES WITH TAPE TRANSPORT MECHANISM


Power Switch "ON"—Capstan does not rotate
VU Meter Lamp lit
Automatic Shut-Off Switch at "ON" position.
Turn Shut-Off Switch "OFF".
Fuse Blown
Replace Fuse
VU Meter Lamp Lit
Flywheel is separated from the Capstan Drive Belt
Main motor defective
Replace Motor
Power Condenser defective
Replace Power Condenser
Capstan rotates at Playback position but Reel Motor does not rotate
Operation Switch at "OFF" position
Brake Lever caught
Check operation of Brake Lever.
Does not Reverse Play
Reverse Relay Operating
Contact of Reverse Relay Contact point defective
Replace Reverse Relay
Reverse Relay not Operating
Check Transistors TR-201 to TR-203 of Reverse Switching Circuit
Tension Arm dropped
Set tape at Tension Arm
Playback Head does not lower at Reverse position
Normal Voltage at lug terminal of Reverse Solenoid
Reverse Solenoid defective
Replace Solenoid
No Voltage at lug terminal of Reverse Solenoid
Connector Poo one (Poo 1) and J0301 contact faulty
Reverse Relay (RL0201) defective
Does not Rewind
Rewind Change Switch (SW002) Actuater Spring defective
Replace Actuater Spring
Supply Reel Motor defective
Replace Supply Reel Motor
Brake Band is touching Brake Drum
Brake Lever operation faulty
Tension Arm drops and Tape stops during Rewind Operation
Tension Arm Spring too strong
Replace Spring or grease and loosen Tension Arm Shaft
Fast Forward Operation does not work
Fast Forward Switch Actuater Spring defective
Replace Actuater Spring
Take-Up Reel Motor defective
Replace Tape-Up Reel Motor
Brake Band Touching Brake Drum
Check operation of Brake Lever
Tape slack when stopped from Fast Forward or Rewind
Brake operation unbalanced
At stopped position, check tension of left and right Brake.
Tension Arm moves up and down during Fast Forward
Reel Table Shaft Bent
Replace Reel Table Shaft
Tape Speed Slow
At Playback Mode, check to see whether or not the Brake Band is touching the Brake Drum
Check to see whether the Capstan Drive Belt is stretched
Wow and Flutter
At Playback Mode, check to see whether or not the Brake Band is touching the Brake Drum
Pinch Roller Shaft and Flywheel Shaft needs oil
Lubricate
Oxide has collected on the Tape Guide Metal inside Head Assembly and patches comes off on tape
Clean Tape Guide

SECTION "B" TROUBLES WITH AMPLIFIER

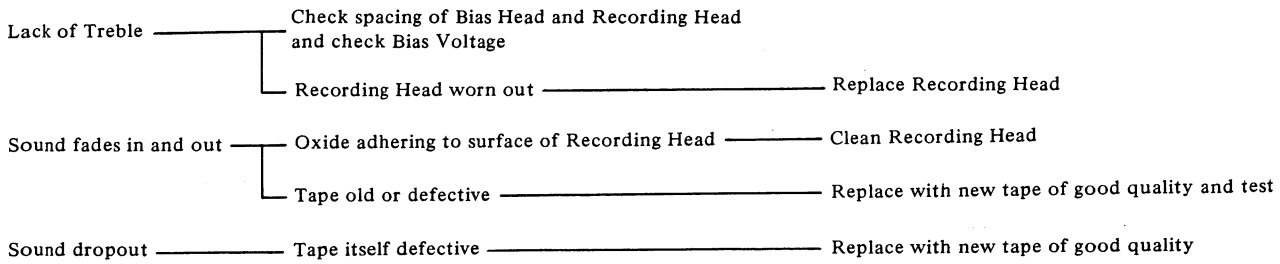
1. Playback Mode


No sound from Internal Speaker
Normal sound when connected to External Speaker
Internal Speaker Defective
Replace Speaker
No sound when connected to External Speaker
Transistor TR 1, TR 2, or TR 501 or TR 502 defective
Replace transistor
Distorted sound from Internal Speaker
Normal sound when connected to External Speaker
Intenal Speaker Defective
Replace Speaker
Sound distorted when connected to External Speaker
Transistor TR 501 or TR 502 defective
Replace transistor
Improper adjustment of VR 501 or VR 502
Re–adjust
Sound from left and right speakers unbalanced even when volume controls are set to Maximum
Improper adjustment of Main Amplifier Level Control Potentiometer VR 601 (20 K Ω B)
Re-adjust
No sound from Line-Out Jack
No B (+) Voltage Supply
Diode D401 or transistor (TR401) 2SD223 defective
Replace
B (+) Voltage Supply present
Mute Relay is operating
Transistor (TR104) defective
Replace
Check working order of Transistor TR101, TR102 and IC101
Broken wire within Playback Head Coil or broken Lead Wire
Will play back, but volume insufficient
B (+) Voltage low
Diode D401 or Transistor (TR401) defective
Replace
B (+) Voltage normal
Oxide has accumulated on the Head
Clean Head
Humming noise
When Playback Head grounded noise decreases
Hum backing coil adjustment faulty
Re-adjust
Open circuit Playback Head Coil
Replace Playback Head
Grounding Playback Head does not alter hum
Power Supply Circuit Transistor (TR401) defective
Replace
Sound distorted
Oxide has accumulated on Playback Head
Clean Head
Check to see if B (+) Voltage is normal
In case B (+) Voltage is low, check D401 and TR401
In case B (+) Voltage is normal, check voltage of preamplifier parts
Hissing Noise
When tape is running, hissing noise increases
Head is magnetized
Demagnetize Head
Tape itself noisy
Replace Tape
Open Circuit Playback Head Coil
Replace Playback Head
Irregular Scratching or Cracking Noise
Transistor TR101 or TR102 defective
Replace transistor
Resistor R104, R105 or R107 defective
Replace Resistor
Squeaking Noise
Oxide collected on surface of Playback Head
Clean Head
Tape itself squeaks
Replace Tape

- Lack of Treble
  - Oxide collected on surface of Playback Head — Clean Head
  - Discrepancy in Playback Head Azimuth Alignment — Re-adjust Azimuth alignment
  - Head worn out — Replace Head
- No muting when switching from Reverse Play to Normal Play — Transistor TR104 or Mute Relay (RL101) defective

2. Recording Mode

- Does not Record
  - VU Meter does not operate
    - Recording input signal level is too low
    - Recording/Playback Slide Switch not working properly — Readjust Recording/Playback Slide Switch
  - VU Meter operates properly
    - Faulty adjustment Poteniometer VR102 — Re-adjust VR102
    - Transistor TR103 defective — Replace Transistor TR103
    - Bias Oscillator Circuit not operating — Check Bias Oscillator Circuit
    - Bias Head does not move — Check position of Bias Head Shift Lever
    - Oxide Collected on surface of Recording Head — Clean Head
- Sound Distorted
  - VU Meter operating properly and Recording Monitor Sound also normal
    - Operation of Bias Oscillator Circuit faulty — Check Bias Voltage and Bias Oscillator Circuit
    - Oxide adhering to surface of Recording Head — Clean Head
    - Transistor TR103 defective — Replace transistor
  - VU Meter operating properly but Monitor sound distorted
    - Recording input signal level excessive — Lower level of Recording input signal
    - Recording input signal distorted
- Faulty Erasure
  - Does not erase at all
    - Check erase voltage at both Erase Head contacts (about 90 volts)
    - Erase Head defective — Replace Erase Head
    - Check Bias Oscillator Circuit
  - Incomplete erasure
    - Oxide adhering to surface of Erase Head — Clean Erase Head
    - Discrepancy in Height adjustment of Erase Head — Re-adjust Erase Head height
- Erase Noise Excessive
  - Head magnetized — Demagnetize Head
  - Tape itself defective — Replace with new tape of good quality
- Recording Level Low
  - Dust adhering to surface of Recording Head — Clean Head
  - Check spacing of Bias Head and Recording Head as well as Bias Voltage
  - Faulty adjustment of Potentiometer VR 102 of Record Amplifier — Re-adjust Potentiometer VR102
  - Tape itself defective — Replace with new tape of good quality


Lack of Treble
Check spacing of Bias Head and Recording Head and check Bias Voltage
Recording Head worn out
Replace Recording Head
Sound fades in and out
Oxide adhering to surface of Recording Head
Clean Recording Head
Tape old or defective
Replace with new tape of good quality and test
Sound dropout
Tape itself defective
Replace with new tape of good quality

MEMO